



United States
Environmental Protection
Agency
www.epa.gov/osw
April 2007

FOUNDRY SANDS RECYCLING

EPA's solid waste management hierarchy promotes waste reduction first, recycling and reuse second, and environmentally safe disposal of any remaining material last. Increasing the recycling and use of industrial byproducts, like spent foundry sands from iron, steel, and aluminum foundries,¹ is one of the four priorities in EPA's Resource Conservation Challenge (www.epa.gov/rcc).

Spent foundry sands are generated by the metal casting industry. Foundries purchase new, virgin sand to make casting molds, and the sand is reused numerous times within the foundry. However, heat and mechanical abrasion eventually render the sand unsuitable for use in casting molds, and a portion of the sand is continuously removed and replaced with virgin sand. The spent foundry sand, that is, the sand that is removed, is either recycled in a non-foundry application or landfilled. Estimates are that less than 15 percent of the 6-10 million tons of spent foundry sands generated annually is recycled. The Agency believes a greater percentage of spent foundry sand can be safely and economically recycled.

The recycling of nonhazardous, spent foundry sand can save energy, reduce the need to mine virgin materials, and may reduce costs for both producers and end users. For example, in cold weather climates, use of spent foundry sands as construction site base material extends the construction season because such sands won't freeze as readily as most soils.

EPA has found that spent foundry sands produced by iron, steel, and aluminum foundries are rarely hazardous. EPA supports the use of spent foundry sands from these foundry types in the following applications:²

- As partial replacement for fine aggregate in asphalt mixtures;
- As partial replacement for fine aggregate in Portland cement concrete;
- As source material for the manufacture of Portland cement; and
- As a sand used in masonry mortar mixes

In addition, use of foundry sand from iron, steel and aluminum foundries in flowable fill, road embankments, road base, manufactured soil, agricultural amendments, and similar uses may be appropriate depending on the site and the sand composition.³ For these applications, characterization of the sand and a site-specific assessment are recommended before use.

Regardless of the application, foundries and foundry sand recyclers should consult state regulators to ensure that planned uses are consistent with state beneficial use and waste management programs and that the chemical and physical properties of the sand meet applicable state environmental limits, engineering performance criteria, and other state requirements.

Once a foundry decides to recycle spent sand, it is recommended that the sand be managed in a way that will prevent contamination and provide a quality product to the end user so that it is more likely that foundries will be successful in finding reuse and recycling markets for the spent sand. Foundries that are interested in using their spent foundry sand can consult the American Foundry Society guide, *Turning Used Foundry Sand into a Marketable Resource: Best Management Practices for Beneficial Reuse*. This guide explains how to start a recycling program, lists sand end users' general

requirements, and provides a recycling program checklist (www.afsinc.org). Another source of information on foundry sand recycling is the website, *Foundry Industry Recycling Starts Today* (www.foundryrecycling.org).

In addition to promoting the recycling of spent sand, EPA encourages foundries to explore other opportunities for pollution prevention through the use of innovative and alternative technologies and materials, as well as source reduction. More information on foundry sand recycling is available on EPA's web site: <http://www.epa.gov/epaoswer/osw/consERVE/foundry/index.htm>

¹ Foundry sands also come from other types of foundries, such as from brass and bronze foundries, that are often characteristically hazardous and are therefore not included in this statement.

² The Federal Highway Administration booklet *Foundry Sand Facts for Civil Engineers* (Report Number FHWA-IF-04-004) notes that spent foundry sands perform as well or better than quarried sand and natural soils in the listed applications.

³ The United States Department of Agriculture (USDA) has been conducting research on various agricultural uses of foundry sand. USDA and EPA are partners in increasing the recycling and use of industrial byproducts, and USDA will be publishing guidelines for the use of industrial byproducts in agricultural applications (<http://www.ars.usda.gov>).