

Manufacturing PVC has some environmental costs. Vinyl chloride is a carcinogen produced from ethylene and chlorine. PVC manufacturing produces about 4.6 million lb of vinyl chloride emissions each year. PVC manufacturing has been associated with the presence of dioxin—one of the most toxic substances known—in the environment; however, research has not established a clear risk associated with the quantities observed. More dioxin is produced when PVC is burned, however.

Some concerns associated with the decomposition of PVC are associated primarily with architectural or electrical uses of plasticized PVC and do not appear to be relevant to the exterior site applications of the material. PVC is difficult to recycle into consumer goods, however, primarily because of the wide range of formulations used in making different PVC products. Incinerating PVC is problematic because it has a low fuel value and it turns into hydrochloric acid as it burns, increasing the wear on incinerators.

Many products made of PVC include formulations that include lead and other toxins, and although these products are not usually associated with site development applications, there is noteworthy concern about the environmental costs and impacts of PVC manufacture, use, and disposal. There have been calls for stopping the manufacture of PVC because of these concerns.

Vitrified clay pipe (VCP). Vitrified clay pipe has been replaced in most applications by PVC, but it is still used for some applications. Many VCP installations are still in use for well over 100 years. It is durable and resistant to chemical corrosion, and it has the lowest thermal expansion coefficient of any pipe material. The weight of VCP (8.9 lb/ft for a 4-in VCP versus 2.0 lb/ft for a 4-in Schedule 40 PVC) leads to more handling and greater installation labor costs. As PVC has replaced VCP as the material of choice, the availability of VCP has dropped in some areas.

Cement and concrete

Concrete is widely used in all types of construction because it can be cast into a desired form and it is durable once it is cured. Cement manufacturing and concrete mixing make up a large business sector involving about 210 cement plants and almost 5000 ready-mix plants in the United States. Most ready-mix concrete for residential purposes is approximately 12 percent cement. The most common cement used is portland cement.

Manufacturing cement involves mixing a source of calcium (usually limestone) with finely ground additives (such as bauxite or iron ore) in a rotary kiln heated to about 2700°F (1480°C). As the kiln mixes the heated materials, a series of chemical reactions occurs: The materials form a molten mass, which is cooled and then ground to a powder, which is mixed with some gypsum to become cement. In turn, cement is mixed with sand, aggregate, and water and possible admixtures as specified to control setting time or plasticity of the final material.