

Plumbing a high-performance building with cast iron

By Paul Riedinger



There are key elements to consider when designing a high-performance building. These buildings should make environmental sense, be economically sound, and encourage productivity for building occupants. The following helps illustrate why cast iron soil pipe and fittings are often chosen by engineers and designers for DWV plumbing systems in commercial buildings.

Cast iron soil pipe (CISP) manufactured in the U.S. is produced with 96 percent recycled content and is 100 percent recyclable. Over the last several decades, tens of millions of tons of scrap iron have been recycled to produce CISP. In addition, by recycling scrap iron the manufacturer eliminates the need for the use of pig iron, which has a much larger environmental footprint.

The benefits extend further than the manufacturing process. CISP also reduces the exposure to volatile organic chemicals (VOC's) on a project. When installing CISP, no cleaning fluids or solvent cements are needed to join them. Additionally, U.S. cast iron manufacturers use a low VOC coating, versus the high VOC epoxy coating often used in other parts of the world. By reducing high VOCs, the engineer creates a better indoor air quality for those who will occupy the building, as well as the contractors installing the plumbing system.

Another environmental benefit comes with the underground installation of cast iron. Cast iron has very high load ratings and is eight times stronger than thermoplastic sewer pipe. Unlike flexible pipe, there are very few special requirements for burying CISP. The ground should be even, with small indentations for hubs and couplings; the trench should be slightly larger than the pipe; and there are no special beddings required, unless the installation is in rock.

Alternatively, PVC requires the proper techniques for burying, as spelled out in ASTM D 2321. These include excavating the trench width in direct proportion to the size of the pipe, carefully preparing the bedding to a specific constant, and providing critical haunch support of the pipe by backfilling the appropriate aggregate in six-inch layers, with each layer sufficiently compacted 85 to 95 percent.

Impact on building occupants

High-performance buildings deliver a comfortable and productive environment for building occupants, which includes healthy indoor air quality. CISP contributes to indoor air quality by eliminating the sound pollution sometimes created by other DWV materials.

Excessive noise is known to cause distractions and creates an environment where productivity can be hurt. It can lead to sleep disruption and increased levels of stress for both healthy people and people struggling in a hospital bed. Through independent third-party research, CISP has been shown to be 750 percent more effective than PVC at providing a quiet indoor

environment. Consider further the issues raised by noise in projects where sleep and healing are necessary for health, such as housing, hospitality and hospitals.

A 2008 survey by A.H. Jha, in *The New England Journal of Medicine*, showed that patients in healthcare facilities identified the noise levels around rooms at night as the quality of care factor with the most room for improvement.

Research shows that noise pollution can lead to stress, which can lead to a variety of health issues including fatigue, indigestion, hypertension, memory problems and the secretion of adrenaline.

This can be challenging to consider for a project with shared walls and additional components. For these reasons, a designer should evaluate whether the building components and systems, including DWV systems, contribute to or reduce noise pollution and consider specifying CISP.

Economically sound

It is important to design a building with low-maintenance systems that will perform well for many years. Because of the exceptional performance and long life of cast iron, the DWV system can be operated and maintained within the limits of existing resources for years to come. CISP is designed to last for the life of the building. One example is an Indianapolis pharmaceutical company that contacted me because they wanted information about properly repainting the 135-year-old cast iron installed in one of their oldest buildings. According to their head of maintenance, this product was functioning perfectly, but just needed to be refinished.

I would contend that in our "throw-away" society, very few of the products we consume are meant to last more than 10 years. CISP has shown to be strong and robust, and with routine flushing and maintenance of adjoining systems such as grease interceptors, CISP should last the life of the building.

By identifying elements and choosing the correct products and techniques, a designer can create a high-performance building that focuses on the comfort, health and well-being of the building occupants, while providing the owner with a low-maintenance, long lasting facility. This encourages a more productive work, learning, healing or living environment that is not only beneficial to the owner and building occupants, but to the environment, as well. The environmental footprint, the sound-deadening qualities, and the positive economic factors make cast iron soil pipe and fittings a good choice for the DWV plumbing system in high-performance buildings. ■

Paul Riedinger, LEED AP BD+C, is a Field Technical Representative for Charlotte Pipe and Foundry.