

Decontamination, Decommissioning and Remediation/ Waste Management Grouting System

Background

Westinghouse uses treatment and conditioning processes to convert a wide variety of radioactive waste materials into forms that are suitable for their subsequent management—including transportation, storage and final disposal.

The use of specially formulated grouts provides the means to immobilize radioactive material that is in various forms of filter cartridges, supercompacted pellets or in other forms of non-compactable radioactive waste.

Description

The Westinghouse grouting system is applicable to diverse drum and chamber types. It can be manually or fully automatically operated with flexible positioning for operation due to high pumping capacity. The system is based on proven technology and is compatible to other Westinghouse waste treatment systems. The system is available in both stationary and mobile designs.

The Westinghouse grouting system is designed as a modularized system. It usually consists of four modules: mobile silo, grouting mixer, control unit and filling station with drum/container docking. Optionally, a wall penetration is used if mixing and grouting processes take place in different areas for radiation protection reasons. However, the system can be customized to a customer's specific needs.

Mobile Silo Module

The mobile silo module includes a silo, mounted in a steel frame with castors. The silo is equipped with a vibrator device, a flap valve at the lower end and a level measurement. With the silo module, the cement can be transferred from storage to the operation area. Once the Silo Module is connected to the Grouting Mixer, the cement flows through the flap valve and feeds the Grouting Mixer continuously while grouting.

Alternatively, the cement transfer can be done by an interchangeable silo or continuous filling of the Silo Module. To avoid cement leaking, the silo is designed to ensure sealing. The silo can be transported and easily maintained.

Grouting Mixer

The grouting mixer is the key component of the grouting system and consists of a mixer body, including dosing screw and rotary valve. A swiveling mixing chamber with mixer and screw pump is attached to the mixer body. The body is mounted in a steel frame with castors.

The cement is dispensed through the rotary valve and the dosing screw to the mixing chamber where the mixing process with water takes place. During the mixing process, the material is continuously conveyed out of the mixing chamber by a screw pump. In a flexible hose, the grouting material will be conveyed to the Filling Station.

The grouting mixer is equipped with level sensors for the cement and the grout. Therefore, dosing and mixing operation run fully automated.



Grouting Mixing Unit

Control Unit

The control cabinet is integrated into the control unit, which includes control system (PLC) and the power supply for the electrical equipment. An operator panel for local operation and a user-friendly HMI is integrated in the front door. A communication interface ensures a signal transmission to a superior PLC.

The Grouting System can also be operated remotely from a control room.

In the lower part of the Control Unit, the water and liquid additive dosing equipment takes

place. Pumps and sensors assure an accurate dosing into the mixing chamber. The Control Unit is mounted into a steel frame with castors and contains all electrical and control interfaces as well as the water supply interface and an additive storage tank.



Westinghouse grouting system with interchangeable silo

Wall Penetration and Filling Station

The Grouting Wall Penetration is a unique device that allows drum/container filling in high radiation areas without access during operation. The Wall Penetration contains all equipment to transit grouting material and interface/power cables in a radiological safe manner to the Filling Station.

Typically, the filling of drums or containers takes place at a Filling Station with interfaces to the Grouting Mixer, off-gas system and necessary equipment for continuous level monitoring and video. At the lower end of the Filling Station the docking device allows a safe connection between drum/container and the Filling Station.

Technical details

- Treatment type: grouting
- Waste input: packed drums or containers
- Capacity: 0.9 – 1.5 m³/h (grout, continuous throughput)
- Length x Width: 4 m x 3 m
- Height: 4 m

- Weight: 2600 kg
- Removable/exchangeable cement silo

Benefits

The Westinghouse grouting system offers:

- Proven grouting cement recipe as well as adaptation to other recipes
- Mobile equipment for campaign driven operation
- Easy to transfer the equipment out of the controlled area for maintenance and refill tasks
- Continuous cement mixing and pumping (local operation and mixture setup) can take place outside of areas with radiation or zones with high dose rates (with Wall Penetration)
- Control panel for local or remote operation
- Fill Stations with docking device for multiple packaging formats
- Easy maintenance and cleaning

Experience

Westinghouse has a long global experience supporting nuclear power plants and national lab sites, with grouting systems that can be customized to a customer's specific needs. Westinghouse has successfully performed more than 15 projects globally.