PROVEN, SAFE AND EFFICIENT TREATMENT OF RADIOACTIVE WASTE

Bilfinger Noell offers components and services for nuclear facilities worldwide and supplies everything from design to installation from one source.

- Equipment for new and existing Nuclear Power Plants
- Hot Cell Technologies / Remote Handling Technique
- Equipment for Storage of Radioactive Materials
- Waste Treatment / Waste Conditioning
- Size and Volume Reduction
- Dismantling of Nuclear Facilities
- Design Engineering / Structural and Dynamic Analyses

UP-TO-DATE KNOW-HOW – HIGHEST QUALITY!
FIND OUT MORE ABOUT HERMINE™ FOR WASTE TREATMENT IN NUCLEAR FACILITIES
SURVEY

Bilfinger Noell supplies Super-Compactors manufactured acc. to your waste specifications for reducing the volume of activated and contaminated waste such as core fittings, structural elements of fuel rods, and also low to mid-level radioactive waste. Volume reduction of radioactive waste is one of the key issues and economic factors for repositories. Super-Compactors can be adjusted to be used with various kinds of waste containers.

The transfer of the Super-Compaction technology in 2014 from Fontijne Grotnes BV into Bilfinger Noell’s product portfolio, also strengthened our leading position as a system supplier for radioactive waste treatment equipment in nuclear facilities.

With further attractive solutions and highly efficient technologies for Super-Compactors, Bilfinger Noell is able to provide a wide variety of systems used to reduce the volume of radioactive waste:

- Solid low level waste (LLW) and intermediate level waste (ILW) as well as plutonium contaminated material (PCM)
- Press capacity up to 20,000 kN
- Drum handling for different sizes containing 80 liters, 100 liters, 180 liters, 200 liters and 52 or 55 US gallons
- Capacity of up to 15 drums per hour
- Special features for remote exchange of wear parts

Bilfinger Noell offers system solutions including handling, sorting, and grouting facilities for integrating Super-Compactors in complete waste treatment processes.

**BENEFITS:**

- Reduction of the radioactive waste volume to approx. a quarter of its original volume
- The exclusive supplier worldwide of ILW and PCM Super-Compactor
- Up to 15 drums / hour
- Enormous savings storage space and costs
- Proven and very robust design
- Low maintenance effort
- High reliability
- Experience since 1978, more than 25 nuclear Super-Compactors worldwide in operation
- The most commonly used Super-Compactor worldwide
- Remote exchange of wear parts
SUPER-COMPACTION SYSTEMS FOR LLW

The LLW design enables Bilfinger Noell to propose a cost-effective way for volume reduction. The Super-Compactor design for LLW is available up to 20,000 kN. The innovative design of the Super-Compactor provides an economical product to meet customer requirements.

Compaction capabilities

The 20,000 kN Bilfinger Noell Super-Compactor is capable of achieving significant volume reduction. Nearly the maximum possible density can be reached for some types of radwaste.

1. ELECTRIC MOTORS
   Final density 3.4 kg/dm³

2. STEEL SCRAP PARTS
   Final density 3.0 kg/dm³

3. PAPER AND RAGS
   Final density 0.9 kg/dm³

The corresponding recordings illustrate the press force against the stroke of plunger (reduction – puck height) exerted during the compacting cycle of drums with three different waste types.
SUPER-COMPACTION SYSTEMS FOR ILW

Bilfinger Noell ILW Super-Compaction Systems are suitable for the volume reduction of beta / gamma waste and PCM. These Super-Compaction Systems are equipped with drum and puck recovery systems.

The drives and actuators are placed outside the cell and the system is especially designed for operation in an inaccessible environment. The design of the ILW Super-Compaction System enables an exchange of wear / spare parts by remote control.

Additional Features of ILW Super-Compaction System:

- Drive mechanism installed outside the cell
- Remote loading / unloading equipment
- Measuring systems
- Drum and puck recovery procedures
- Remote replacements of wear / spare parts
- Remote operation / maintenance
- Manipulators
- Suitable for waste temperatures up to 300° C
- Shielding

The Super-Compactor is designed for operation in Hot Cells. The following waste can be compacted with the ILW Super-Compaction System:

- Steel scrap
- Contaminated components from reactor cores
- Inflammable waste such as paper, plastics, rubber
- Self inflammable material like scrap contaminated with Sodium and Zirkaloy
IN-DRUM-COMPACTORS

In-Drum-Compactors serve as an optimisation unit during the sorting of waste. The IDC provides a pre-compaction of soft waste to optimise the filling of waste drums.

The In-Drum-Compactor (IDC) has a main compactor body, made of welded steel with an opening for inserting e.g. 200 litres drums. The upper frame is the base for the compression plunger, which can be driven hydraulically or electrically. After retrieving the plunger to its upper position, additional waste can be added. These steps can be repeated as often as required.

Bilfinger Noell’s IDC has the following features:

- Handling of Low and Intermediate Level (soft) waste
- Electrically or hydraulically driven
- Press force from 100 kN – 500 kN
- Efficient drum filling
- Low maintenance
- Easy decontamination
- EX-protection
- HEPA-Filter pin on ventilation
- Possibility of autonomous operation or integration in sorting station

PERIPHERAL EQUIPMENT

HANDBLING AND OPTIMIZING EQUIPMENT

Bilfinger Noell has been gaining nuclear experience since the late ’60s. Thus, we are highly capable for the design of special handling equipment used in various types of radioactive waste processing facilities. For the Super-Compactor Bilfinger Noell offers a wide variety of supporting handling equipment.

Bilfinger Noell offers all kinds of handling equipment to provide complete systems for any type of waste treatment facility.

Portfolio:

- Infeed conveyors
- Drum loading / unloading
- Puck unloading
- Piercing Unit
- Weight & height measurement
- Puck selection table for efficient filling of over pack drum
- Puck overpack gripper / loader
- Manipulators
- Double lid system
- Press containment / shieldings
- Liquid collection
- Local ventilation systems with HEPA filters
- Drum docking station
SORTING-COMPACTION-GROUTING FACILITY

Bilfinger Noell offers a number of treatment processes to prepare radioactive waste for long term storage or final disposal. With sorting of the nuclear waste, drums can be automatically or manually filled with proper type of waste. Sorting criteria could be compactibility, decontaminability or combustibility.

To optimize the filling of these drums, an IDC is used. After sorting, and if possible pre-compaction, the drums are compacted in a Super-Compactor for final volume reduction.

The compacted drums are measured first (height / weight) and then selected according to predefined values to optimize the filling of the overpacks. For immobilisation of the pucks inside the overpacks, the remaining gap in the overpack will be filled with concrete. The overpacks are now ready for handover to storage facilities.

Selected references

- Dounreay, UK: Design / supply / installation of a 10,000 kN Super-Compactor for ILW
- Belgoprocess, Belgium: UK: Design / supply / installation of a 20,000 kN Super-Compactor for LLW, including dismantling (removal and packing) of the existing 20,000 kN Super-Compactor, & maintenance and repair of existing peripheral devices
- NPP Haiyang, China: Manufacturing, delivery of a 15,000 kN for LLW
- Belgoprocess, Belgium: Remote conversion / modification of the 10,000 kN Super-Compactor in the Pamela building for ILW
- ANSTO, Australia: Modification of the control system for a 20,000 kN Super-Compactor for LLW
- Supply of a structural-element compactor PKA Gorleben, Germany
- China Academy of Engineering Physics, Mianyang, China: Design / supply / installation of a 5,000 kN Super-Compactor for LLW