

Concept

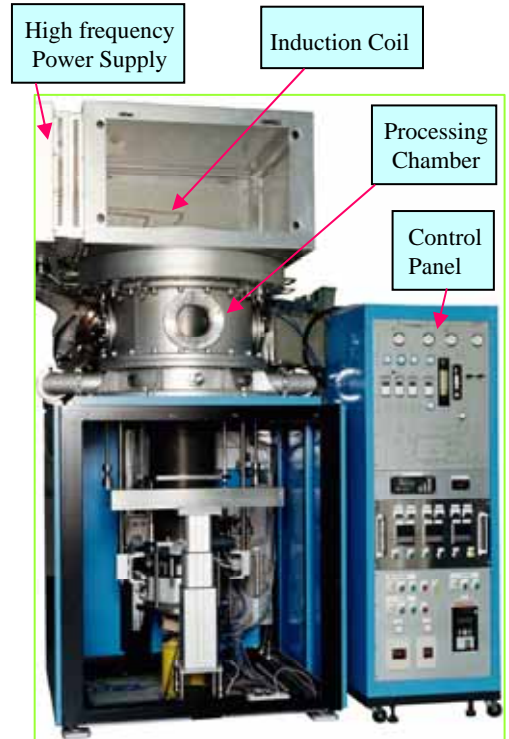
Fuji Resin Reducer (FRR) applying Low Pressure Oxidation Process (LPOP) is the most effective volume reduction system for solid waste of spent resin and charcoal. The spent ion exchange resin generated as radioactive waste in water purifying systems at nuclear power stations and related facilities of nuclear power, has been stored on site and volume has been steadily increasing over the years.

Fuji Electric Systems (FES) has developed a full-scale system of low temperature plasma volume-reduction for spent resin and has accomplished basic performance testing using resin samples imitating spent conditions. As a result, the resin can be reduced in volume by more than 95% ; the processing performance in actual scale was proven to be effective. Additionally, it was clarified that the residuum after the volume-reduction process is easy to mix with cement. The application of this process for stabilization of the disposal has demonstrated to be very effective.

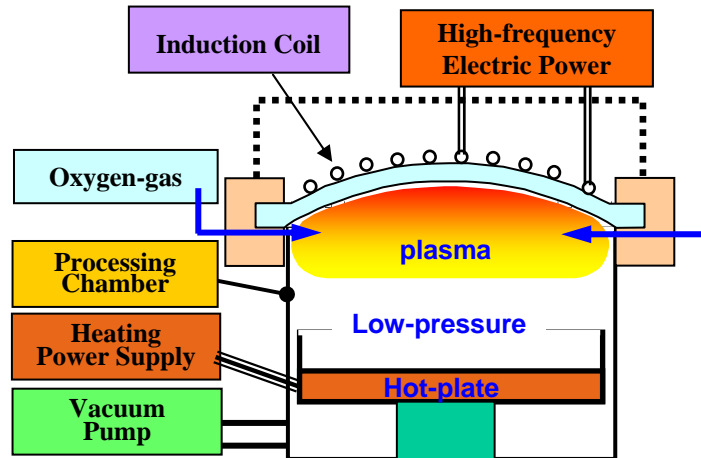
Advantage

- High volume reduction
- Small size unit type system
- Cost reduction for final disposal
- Lower environmental impact
- The residuum is easy to mix cement
- Module type system
- Stabilization process

Item	Specification
Volume reduction method	Inductively coupled plasma Low pressure oxygen Plasma: 0.15 - 0.73psi (10 - 50hPa) Temperature: 750 - 1290 F (400 - 700 C) Low carry-over (<10 ⁻⁴ as Co)
Dealing material	Spent Resin, Charcoal
Capacity	13.2gal (50wet-liter) / day · unit 353ft ³ (10m ³) / year
Volume reduction	More than 95% (1/20 of volume reduction)

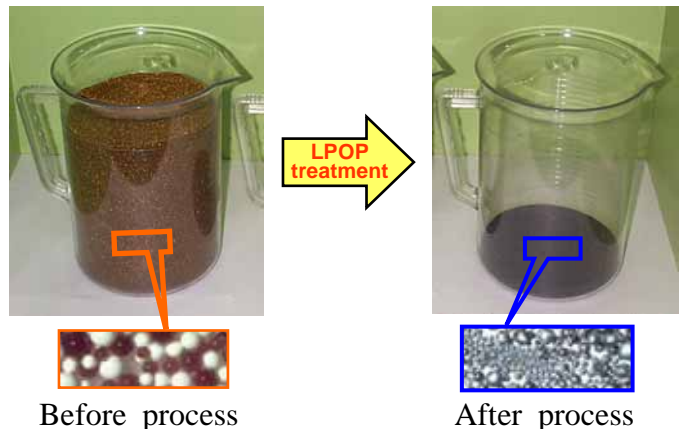


Exterior View of Fuji Resin Reducer



Conceptual Diagram of the LPOP System (using ICP)

*ICP (Inductively Coupled Plasma)



System Configuration

(1) Resin Feeder

The resin feeder is comprised of a heating hopper, fixed quantity hogging device and a gravity flow feeding nozzle. The resin is fed onto the stage within a processing container.

The feeder is constructed so that the resin can be fed under reduced pressure. By continuing the volume reduced pressure process, the resin can be fed into the container continuously.

(2) LPOP Equipment

The LPOP equipment operates a volume-reduction process for the resin in a processing container of 30 inches approx. (750mm) in diameter under reduced pressure oxygen gas atmosphere, utilizing a heating stage of 24 inches approx. (600mm) in diameter with an electric heater and plasma with high frequency electric power. It provides the fixed volume feeder of oxygen gas using a mass flow rate adjuster.

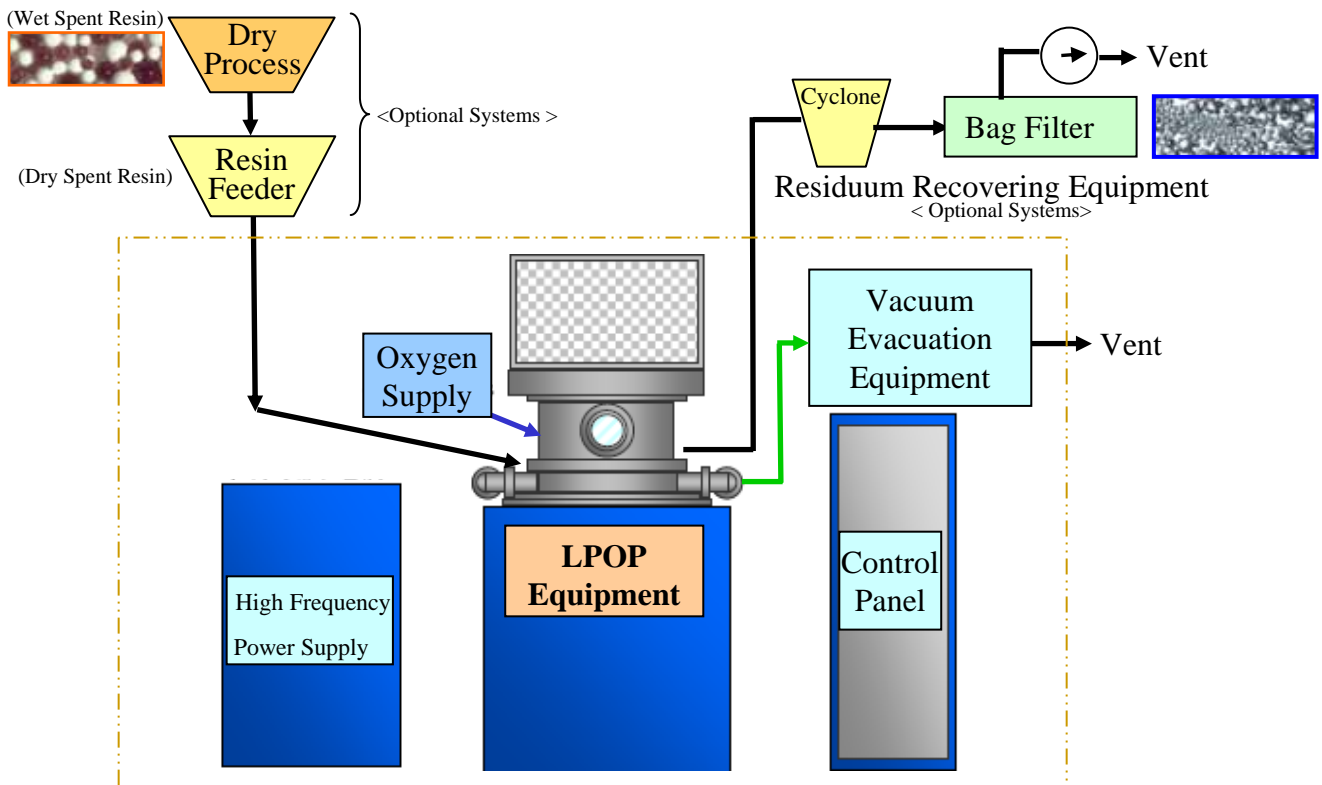
(3) Residuum Recovering Equipment

The residuum recovering equipment recovers residuum by suction with a blower through a cyclone and bag filter.

(4) Vacuum Evacuation Equipment

Vacuum evacuation equipment acts to reduce the pressure of plasma processing by a mechanical rotary pump.

It provides a pressure monitor and an automatic pressure regulator with the conductance adjusting valves.



Configuration of Fuji Resin Reducer

Contact : Fuji Electric Corp. of America

Park 80East, 2nd Floor, 160Pehle Ave, Suite 203 Saddle Brook, Nj 07663
Phone 201-490-3924 FAX 201-368-8258

URL <http://www.fujielectric.com/products/nuclear/>

E-mail: takeuchi.n@feco.fujielectric.com