AVANTech

Waste Packaging Services

Advanced Polymer Solidification (APS™)

AVANTech polymer technologies are the answer for stabilization and encapsulation of radioactive, hazardous and mixed wastes, to provide a long-life barrier against environmental release.

AVANTech is the only supplier of these proprietary stabilization processes. We have applied them in containers from 55-gallon (200-liter) drums to 200 ft^3 (5.66 m^3) containers.

The APS™ In Situ and Continuous Mixing Processes are the subjects of Conference of Radiation Control Program Directors (CRCPD) approved Topical Reports for stabilization of Class A, B, and C wastes, in compliance with 10 CFR 61.

CRCPD approval makes APS™ In Situ and Continuous Mixing the best choices to prepare wastes for interim on-site storage. Also, because the approved waste forms have been accepted by all burial sites, users can save the time, expense, and exposure of handling and reprocessing wastes.

CRCPD approval of APS™ In Situ filter encapsulation makes this process ideal for solidifying filters in liners backfilled with ion exchange resin.

APS™ MOBILE DELIVERY SYSTEM

Advantages of APS™

Regulatory Approval

- ✓ Only solidification method with CRCPD-approved Topical Reports for stabilization of Class A, B, and C wastes
- ✓ Accepted by all US commercial low-level waste disposal sites

Volume Efficient

- ✓ APS™ In Situ produces 0% volume increase
- ✓ APS™ Continuous Mixing has <5% volume increase
- ✓ Mitigates system transients

Improved Waste Form

- ✓ Compressive strength 5-10 times better than cement
- ✓ Leach index up to 10,000 times better than cement

Controlled and Consistent

- ✓ PCP determines polymer formulation
- ✓ Reliable translation from bench to full-scale

Chemically Tolerant

- ✓ Tolerates wide waste pH range
- ✓ Unaffected by sulfates, nitrates, ammonia, and media

User-Friendly

- ✓ Portable, skid mounted or trailer mounted
- ✓ Reliable, low maintenance operation

ALARA

- ✓ Shielded to minimize exposure
- ✓ Remote operation and control
- ✓ Video monitored

Economical

- ✓ Low capital equipment cost
- ✓ No HIC or burial overpack required
- ✓ Reduced waste volumes save cost of transport and burial

Advanced Polymer Solidification (APS™)

APS™ In Situ

This process solidifies and encapsulates materials without mixing.

APS™ In Situ is excellent for solidification of coarse or granular media with easy-to-penetrate interstitial spaces.

APS™ In Situ Applications

- ✓ Spent ion exchange bead resin
- ✓ Spent LOMI/CITROX bead resin
- ✓ Zeolites
- ✓ Filter elements (encapsulation)
- ✓ Hardware pieces (encapsulation)
- ✓ Metal pieces (encapsulation)
- ✓ Swarfs (encapsulation)

APS™ In Situ Process

In the APS™ In Situ process, waste is placed into a carbon steel storage/disposal liner or drum fitted with dewatering internals, and then dewatered through a fill-head.

APS™ In Situ polymer is metered and mixed in-line, then vacuumed into the dewatered liner through the fill-head. The liquid polymer forms a cap over the media, allowing a vacuum to pull the polymer through the waste, coating each particle, filling spaces, and displacing water and air. The polymer forces any remaining water to the low point of the liner, where it is vacuumed away through the dewatering internals.

In encapsulation of filters and hardware, spaces between the materials let polymer flow to the bottom of the container. The container fills from the bottom; air is pushed ahead of the polymer up and out of the container.

After APS™ In Situ polymer is introduced, solidification in the storage/disposal container progresses without further intervention. Bead resin solidifies to a storable product in 2-4 hours. Encapsulated filters are ready to store in 1 hour. Solidification is confirmed by temperature monitoring.

APS™ Continuous Mixing

This process involves high-shear mixing of the polymer with waste materials.

APS™ Continuous Mixing is ideal for powdered/granular/sludge wastes and other material that lacks easy-to-penetrate interstitial spaces.

APS™ Continuous Mixing Applications

- ✓ Sludges and ion exchange resins, dewatered or dry
- ✓ Carbon filtration media
- ✓ Powdered ion exchange media
- ✓ Filter aids
- ✓ Dried concentrates
- ✓ Incinerator ash

APS™ Continuous Mixing Process

In the APS™ Continuous Mixing process, waste is mixed with solidification polymers in a continuous mixer, then discharged to a waste container.

This permits the stabilized material to pass Toxicity Characteristic Leaching Procedure (TCLP) and leach testing. Typically, loadings of 95% by volume and >95% by weight can be achieved.

Processing involves a high-shear continuous mixer that can transfer the material to any container. AVANTech can provide remotely operated systems for these applications.

Class B and C wastes have been encapsulated using a remotely operated stabilization system that mixes the waste and polymer, then monitors the exotherm.

A simple and small volume Process Control Program (PCP) is scalable from 100 ml to 5.7 m^3 volumes with no adjustments in formulation.

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