Hazardous Waste Treatment Solutions

50 years experience delivering Hazardous Waste Treatment Solutions
ABOUT TETRONICS

Tetronics International is the global leader in the supply of Direct Current (DC) plasma arc systems for a wide range of Hazardous Waste Treatment applications. Our plasma solutions are perfectly suited to treat a range of hazardous waste streams, including: Fly Ash and Air Pollution Control residue (APCr), Organics, Spent Potliner, Asbestos, Radioactive Wastes, Oily Sludges and Chemical and Biological warfare agents and precursors.

Our capabilities encompass everything from initial modelling/feasibility assessment, pilot testing of the process material, through to design, supply onsite installation/commissioning and on-going support of full commercial plants.

Tetronics’ track record in advanced environmental waste treatment and material recovery processes for a range of toxic, hazardous/industrial wastes, as well as other resource-rich streams, has resulted in more than 90 installations across a wide and varied range of applications.

Tetronics continues to work in association with many of these customers, both private and public, in developing upgrade/optimisation improvements, providing specialist advice, spares and service. Their experience has led to the development and enhancement of the plasma technology, delivering a number of benefits:

Why Tetronics?

- Five decades of experience in developing and delivering hazardous waste treatment systems
- Breadth and scope of our Intellectual Property – 109 patents granted or pending across 12 families
- On-going technical support to our customers
- Market, operational and compliance knowledge and deep technical competence of our staff

Why Plasma?

- High Destruction and Removal Efficiency (DRE) with levels of 99.9999% typically achieved
- Low capital and operating costs
- Provides a ‘future proof’ solution for managing business risk
- Clean, functional heat source with strong environmental benefits
- Generates value from hazardous waste
APPLICATIONS

Tetronics’ technology has been tried and tested over five decades with more than 90 installations globally across a wide and varied range of applications. Our customers can rest assured that Tetronics offers versatility and experience to deal with their specific hazardous waste treatment challenges.

Hazardous waste applications include, but are not limited to:

- Fly Ash and Air Pollution Control Residue (APCr)
- Construction Waste (e.g. Asbestos)
- Chemical Waste (e.g. Organics)
- Aluminium Manufacturing Waste (e.g. Spent Potliner)
- Petrochemical Waste (e.g. Oily sludges)
- Nuclear/Radioactive Waste (both man-made and naturally occurring)
- Chemical & Biological Waste (e.g. Warfare agents and their precursors)

“Tetronics’ experience in the application of plasma technology has resulted in an enviable international reputation, not only for the quality of plasma systems but also for the depth of technical expertise.”

FICHTNER
APCr and Fly Ash

Tetronics’ hazardous waste treatment plants offer a near zero-waste outcome and compelling commercial advantages for the treatment of Air Pollution Control residue (APCr) and fly ash. The process is designed to separate and destroy the hazardous components of the APCr, leaving a non-hazardous material with a valuable secondary use.

APCr is a mixture of fly ash, organic pollutants (including dioxins and furans), carbon and alkaline salts in powder form. It is generated from processes associated with Municipal Solid Waste (MSW) incinerators (approximately 80% generated by this route) and other thermal waste treatments and are classified as hazardous waste due to their capacity to cause lung damage and skin irritations.

Tetronics’ plasma technology uses intense temperature and ultra-violet light to destroy all the hazardous organics of APCr, such as dioxins, furans etc., with Destruction and Removal Efficiency (DRE) levels of 99.9999% typically achieved. The remaining material is vitrified into an inert material called Plasmarok®, which can then be re-used as a building product. Where practical, Tetronics may also be able to extract additional value, as for example, when treating APCr it may be possible to extract chlorine as hydrochloric acid, which can be re-used as a pickling agent, enabling maximum value to be extracted.

To find out how we can assist you with your APCr challenge, please contact us.

Tetronics’ plasma technology has been vital in guaranteeing a practically zero waste facility is achieved. It’s the most viable and flexible recycling system for APC residues.

GREEN ENERGY PARKS - ENERGYPARK PETERBOROUGH
Technical Director

IN FOCUS

Plasmarok®

Approved as a product by the UK Environment Agency
Recovered from Tetronics’ plasma waste treatment process
Mechanically strong
Environmentally stable
Resistant to leaching
Potential to generate value as a building material
Asbestos Waste

Tetronics’ plasma systems offer a proven solution to a range of hazardous wastes, including the treatment of Asbestos Containing Materials (ACMs) and Refractory Ceramic Fibres (RCFs). The patented plasma technology uses intense temperatures to melt the individual asbestos fibres and form a re-usable product called Plasmarok® that can be employed in a range of building applications, enabling our customers to extract value from their waste.

ACMs and RCFs are toxic materials that can cause serious illnesses when inhaled, including lung cancer and asbestosis (a type of pneumoconiosis). Asbestos is strictly prohibited and has been the subject of specific regulations in many countries since the mid-1980s. Unfortunately, owing to its widespread use in manufacturing and construction throughout the 20th century, asbestos is now a common problem. Furthermore the resistance to heat and chemical damage in raw and cemented product form make the disposal of this type of toxic material very challenging.

Tetronics’ technology provides a solution that permanently destroys the hazardous nature of the waste by completely melting the fibres, compared with the far less desirable option of merely packaging and storing the hazard for future generations to deal with.

Please contact us to find out how we can assist you with your ACM and RCF containing waste challenge.
Organics Waste

Persistent Organic Pollutants (POPs)

Tetronics’ plasma systems have been operating for decades in some of the most challenging industrial environments across a growing number of waste applications, including those contaminated with Persistent Organic Pollutants (POPs), such as: PCBs, DDT, Dioxins and Furans.

POPs are toxic chemicals that adversely affect human health and the environment around the world. They have carcinogenic effects in mammals and persist for long periods of time in the environment and can accumulate and pass from one species to the next through the food chain. Many POPs are currently, or were in the past, used as pesticides. Others are used in industrial processes and in the production of a range of goods such as solvents, polyvinyl chloride and pharmaceuticals.

The clean plasma technology developed by Tetronics uses intense heat and ultra-violet light to break down and destroy the hazardous components of chemical waste, leaving behind Plasmarok®, a non-hazardous material with a valuable secondary use as a building product. The process has exceptional environmental and commercial credentials and results in extremely high Destruction and Removal Efficiency (DRE), with levels of 99.9999% typically achieved.

Contact us to find out how we can assist you with your POPs challenge.
Given the experience of Tetronics and the success of their plasma technology in treating hazardous wastes such as SPL, we see Tetronics as a natural technology partner.

MITSUBISHI CORPORATION
Petroleum Coke Unit

Spent Potliner
Aluminium Wastes

With over five decades of experience, including work undertaken in close collaboration with one of the world’s largest aluminium producers, Tetronics has extensive knowledge on how best to treat Spent Potliner (SPL) using its plasma arc technology.

SPL is a contaminated graphite/ceramic cell waste that is routinely generated as a waste by-product during the production of aluminium. The waste has been identified as an extremely problematic hazardous waste because it contains concentrations of cyanide and fluoride and gives off noxious and flammable gases when in contact with moisture. These contaminants readily “leach” into the surrounding soils and groundwater during both short term and long term storage and can cause potential contamination of drinking water reserves. Because of this concern, SPL must be managed and disposed of in an appropriate manner.

Tetronics offer a safe and permanent disposal route for SPL, thereby overcoming the challenges faced by the global aluminium production sector. Not only is the technology tolerant of fluoridated chemical environments, the plasma process enables the vitrification of SPL into an inert non-hazardous material in a single processing step that can safely be disposed of.

To find out how we can assist you with your Spent Potliner challenge, please contact us.
Tetronics has a strong track record of working with the nuclear industry over the last 10 years on a range of demonstration and R&D activities, and especially in the area of Intermediate Level Waste. Tetronics’ plasma technology has a natural versatility that makes it an ideal choice to address the specific challenges of nuclear waste (both man-made and naturally occurring), partly because of its tolerance to different waste material types but also crucially because of its ability to transform the waste into a stable and reduced volume glassy form.

The nuclear industry creates some of the most challenging wastes in the world today. Typically, the waste is kept underwater for 3-5 years until the radiation decays to levels that can be shielded by concrete in large storage casks, where it can be held for thousands of years. The costs associated with conditioning, packaging and storage of these wastes are a challenge for the nuclear industry.

Tetronics’ offers a solution to these challenges by using its plasma vitrification technology to both reduce the volume and significantly enhance the stability of the radioactive waste before intermediate storage and final geological disposal. The ultimate goal is to reduce the overall cost of managing nuclear waste and our assessments indicate that the likely lifetime cost savings of using plasma vitrification to stabilise nuclear waste amounts to billions of dollars globally.

Please contact us to find out how we can assist you with your nuclear waste challenge.

“... We look forward to working with Tetronics to develop nuclear aligned plasma technology that can play a key role in reducing the costs of nuclear waste management in the UK...

COSTAIN
Research and Technology Manager

Nuclear Waste
Radioactive Materials

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Please contact us to find out how we can assist you with your nuclear waste challenge.
Petrochemical Waste

Tetronics has developed its innovative plasma technology to address the growing number of waste management challenges specific to the petrochemical sector, including the recovery of hazardous and chemically difficult wastes. Examples of petrochemical waste include:

- Oily Sludges generated during oil tank cleaning operations
- Hazardous Waste Streams Contaminated with Heavy Metals and Persistent Organic Pollutants (POPs; e.g. PCBs and HCBs)

Traditionally, the petrochemical sector has relied on High Temperature Incineration (HTI) and landfill in order to deal with their hazardous wastes. However, tightening regulation, increasing landfill costs and a greater awareness of social responsibility are driving companies to look at more environmentally friendly methods for treating these very challenging wastes.

Tetronics is able to overcome these challenges by offering a commercial advantage over existing waste management options while at the same time reducing landfill liabilities and conserving natural resources. The technology treats these contaminated waste materials so that the pollutant is destroyed and the bulk mass material is recovered as a safe, inert product able to be re-used in a range of building applications, so completing the sustainability cycle.

Contact us to find out how we can assist you with your petrochemical waste challenge.
Chemical & Biological Waste

Tetronics’ plasma technology is the ideal solution for destroying chemical and biological warfare agents and their precursors, not only because of its tolerance to different waste material types but also crucially because of its ability to transform these incredibly harmful wastes into a stable vitrified material.

In 1997, the Chemical Weapons Convention (CWC), an Arms Control Treaty, came into force, outlawing the development, production, acquisition, stockpiling, transfer and use of chemical weapons and their precursors. All parties under the convention are obliged to prohibit the use and production of chemical weapons, as well as ensuring the complete destruction of these weapons. Member states of the convention are therefore under pressure to find a safe, effective solution that enables them to disarm these materials.

Tetronics plasma technology offers a transportable destruction system that completely immobilises and destroys chemical & biological warfare agents and their precursors with exceptional ecological performance and a typical Destruction and Removal Efficiency (DRE) of 99.9999%.

Contact us to find out how we can assist you with your chemical & biological weapons waste challenge.
We have first hand experience and trust in Tetronics and the effectiveness of their DC plasma arc technology.

HARSCO METALS AND MINERALS
Vice President - Global Solutions (CTO)