ABOUT TETRONICS

Tetronics International is an environmental company with 50 years’ global experience delivering clean plasma technology for maximum resource recovery and the highest levels of hazardous material destruction. This brochure focuses on Tetronics’ solutions for managing Air Pollution Control residue (APCr)/Incinerator Fly Ash.

Tetronics has a proven, turnkey capability, from initial material modelling, pilot material testing, through to financial modelling, plant design and supply. This capability is further strengthened by ongoing technical support worldwide.

Tetronics’ proven environmental waste treatment and material recovery technology has been deployed in over 90 plants globally, serving a wide range of industries with challenges from; highly toxic hazardous wastes through to resource rich recovery applications.

Tetronics continues to support its ever growing number of clients within public and private sectors, with ongoing specialist advice, process improvement, spares and service. The continuous optimisation of their plasma systems bringing increased efficiencies and benefits to their activities.

BENEFITS

Why Tetronics?
- Five decades of experience in developing, delivering and supporting resource recovery 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
- In-house developed and proven plasma technology

Why Plasma?
- Highly versatile, with multiple applications
- Low Environmental Impact
- Near Zero Waste Solution
- Plasmarok® Output - a product not a waste
- Future-Proof Solution, managing risk
Plasma APCr Solution

Clean Plasma Arc Technology: High temperature plasma arcs are heat sources of intense power and versatility, combining the chemically inert heat of a plasma arc with the stability and control traditionally found with a gas flame. Tetronics uses its plasma arc heat sources to melt, gasify or vaporise APCr/Fly Ash to treat, recover and generate valuable commercial products. As the heat source is electrical, the plasma arc treatment technology does not involve any form of direct combustion or incineration. These factors make Plasma an essential component of future sustainable APCr/Fly Ash waste management infrastructure. Benefits include:

- Turns APCr/Fly Ash into two products (refer to page 6):
  - Building Aggregate, Plasmarok®: EA endorsed, non hazardous and extremely resistant to leaching
  - Hydrochloric Acid (HCl) recovered as a product for resale
- Commercially proven robust solution for APCr waste management
- Technology’s environmental and sustainability credentials are ‘best in class’
- Zero waste solution in the treatment of a APCr
- Destruction Removal Efficiencies are typically 99.9999% of hazardous species of APCr
- Commercial plants operational for over 20 years, treating mixed Incinerator Bottom Ash (IBA)/Fly Ash and other residues
- Mitigates risk to human health/environment – best from an Best Overall Environmental Outcome standpoint

Plasma is the most viable and flexible recycling system for APC residues.

Green Energy Parks
Technical Director
About APCr

What is APCr?

APC residues or Fly Ash are generated from processes associated with the operation of incinerators (approximately 80% generated by this route) and other thermal waste treatments. They are classified as hazardous waste as they can cause lung damage and skin irritations. APCr typically account for approximately 3-5% by weight of waste throughput for thermal treatment technologies.

APCr Waste Challenges

Energy from Waste (EfW) capacity is set to grow, leading to a significant increase in APCr/Fly Ash. This hazardous waste represents a significant environmental challenge due to the high levels of alkalinity, volatile heavy metals, Dioxins, Furans, Chlorines and highly soluble salt contents - a safe treatment solution to this waste is imperative. Increases in EU legislation have reduced existing and future landfill capacity, resulting in escalating taxes and costs. These factors, coupled with increased Corporate Social Responsibility pressures have led to a significant, growing interest in Tetronics’ plasma vitrification technology, allowing producers to switch from a disposal solution to a recovery solution, thereby allowing progression up the waste management hierarchy.

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)
Clean plasma technology provides a method for completely removing the hazardous nature of APCr wastes while recovering the overwhelming majority of the input mass as useful by-products for resale and reuse, thus improving the environmental credentials of the EfW plant overall. Plasma technology will also be unaffected by future variations in waste composition as APCr becomes more concentrated and more hazardous over time, in contrast with many alternative methods of treatment where such changes present considerable challenges. This gives the technology future-proofing against potential changes in taxation, gate fees and regulation, thereby removing a key business risk.

In many cases, the potential of plasma to offer large reductions in ultimate hazardous waste emissions, and the impact this has had on obtaining planning permission for the EfW power plant facility as a whole, has been as important as the clear operating cost benefits of the technology. With the growth of this sector set to continue and the increasing stringency of environmental regulation, it seems certain that many more commercial APCr plasma treatment plants will be installed in the coming years. The integration of plasma with modern EfW technology virtually eliminates all secondary hazardous wastes, thereby improving the overall environmental performance, and is an essential component of future sustainable waste management infrastructure.
Plasma plant capacity and benefits of co-location with EfW facilities

A standard Plasma APCr plant processes circa 30,000 – 50,000 tonnes per annum of material. The facilities have a small physical footprint, allowing them to be co-located or retrofitted to new or existing EfW facilities. This model reduces transport miles and environmental emissions, as the waste is treated at the source of generation. This approach also minimises the declared generation of hazardous wastes and avoids double waste handling and regulated consignment note based transfers. The co-location of Plasma facilities alongside EfW plants brings the following benefits:

- **Onsite power supply**
- **Deals with waste at the source/encourages disposal onsite**
- **Saves on transport miles**
- **Utilises the lower carbon conversion factor of the electrical energy produced by the EfW plant**
Plasma turns APCr/Fly Ash into two products:

1. **Plasmarok®**: Plasmarok® is an inert product that is endorsed by the UK Environment Agency for use in a wide variety of applications in the construction and ceramics industries. The Plasmarok® product accounts for 70-80% of the input waste mass of an incinerator plant or other thermal waste treatment facility. As it qualifies as a product rather than a waste, it offers the potential to increase the revenue generated from the plasma process.

2. **Hydrochloric Acid**: During the plasma process, chlorine in the gases can be collected as hydrochloric acid. Not only does this generate a product for sale, but it also avoids the generation of large amounts of secondary waste and the associated waste management costs.

Please contact Tetronics to find out how we can assist with your APCr/Fly Ash waste management challenge.