

Tetronics: Recovery of Base Metals from Wastes

Tetronics Benefits:

Technology tolerant of fine powdered or particulate waste with minimal requirement for pretreatment

Intensive, compact process plant package that can be readily retrofitted adjacent to existing installations

High Destruction and Removal Efficiencies (DREs) of Persistent Organics

Technology is tolerant of chemically challenging waste feeds and is simple to operate and maintain

Control of power input independently of process chemistry

Vitrification of the inorganic slag fraction to produce a dense, environmentally stable Plasmarok® - a product that has the ability to generate value as it may be used in a range of building applications

Technically & Commercially optimised recovery on base metals



Recovery of base metals using Tetronics' technology offers commercial advantage to existing facility operators, providing additional metal recovery free from operational problems, in a single processing step.

About Tetronics:

Tetronics International is the global leader in the supply of Waste Recovery Plants. We have the capability to manage the complete deployment lifecycle of a Waste Recovery Plant from initial testing of the waste material at Tetronics' test facility, the most comprehensive in Europe, through to the physical onsite installation of a full commercial plant, and subsequent support and maintenance through to decommissioning.

Tetronics' patented Direct Current (DC) Plasma Arc plant technology provides the closest solution to Zero Waste currently available. This "green" sustainable alternative for waste management uses ultra-high temperatures to melt, gasify or vaporize any waste material, in order to treat, recover or generate useful commercial products.

As a pioneer in using plasma technology for waste treatment, our multi-faceted, highly qualified research and engineering team have applied the technology to an unrivalled range of waste challenges.

Our technology has been tried and tested over five decades and has been used globally in more than 80 plants across a wide and varied range of applications, including the

treatment of fine powdered feeds without pretreatment like briquetting.

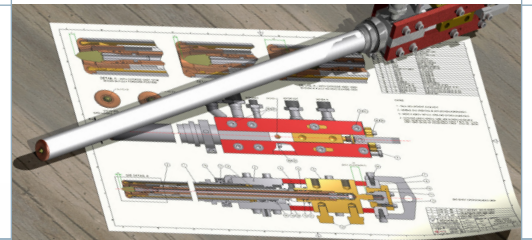
These applications include, but are not limited to: transforming hazardous waste into environmentally safe building aggregate, recovering precious metals from spent catalysts, recovering material values from products and by-products, recovering base metals from waste and improving the quality and efficiency of steel production.

Our principal aim is to provide sustainable and future proof solutions to support organizations in recovering value from their waste materials while meeting their waste disposal and carbon footprint challenges.

What is Base Metal Waste:

Tetronics' definition of base metals are industrial non-ferrous metals excluding precious metals. Examples of base metal bearing wastes are found in the mining, primary and secondary metals refining industries where they produce fine powder wastes (tailings) and base metal bearing sludges which cannot be processed using conventional techniques.

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Base Metals Recovery Challenge:

For conventional techniques such as rotary kiln and rotary hearth furnaces the fine particles are limiting, become entrained in the large combustion gas flows and bypass the furnace without reacting. Additionally, in submerged arc furnaces, water contained in the feed material can cause explosive events as the charge descends towards the melt pool and fine particles are carried away or foul the burden and/or equipment. Sometimes these problems can be remedied by adding a pretreatment process such as drying, briquetting or pelletising but this adds significant cost and time. Tetronics' technology offers a commercially attractive solution free from these operational problems.

How Tetronics Can Help:

Plasma technology is used for the refining of powdered ores, dust, mine tailing and other base metal bearing industrial and urban wastes in a furnace without the need for pretreatment. In essence plasma technology allows value to be obtained from wastes that would otherwise not be considered as a viable resource and would therefore be disposed of or stockpiled. Plasma technology offers a single step process solution for melting, selective reduction and separation.

However, the benefits of plasma do not stop here, as the process can be operated in a number of ways depending on project and territory specifics. Plasma can be used for refining by either concentrating a valued component into a distinct phase(s) and/or 'cleaning' an undesirable component from a desirable phase. The oxide-containing particles are melted and selectively reduced in a refractory lined melting furnace in the presence of a carbon containing solid or gaseous reductant by the action of a transferred arc DC plasma electrode. During treatment the waste is blended with a relatively small amount of reductant and fluxing materials as required and fed in through the roof of the plasma furnace. The feed will partially react in the head space in the presence of the arc where the water is vaporized. Gas flow is low, as is particle entrainment in the off-gas. The feed then lands on the molten surface of the melt pool where it is exposed to further heat from the arc (hot top operation). The feed will partly or wholly react under reducing conditions to form products. The slag overflows continuously from an upwardly inclined tap hole, which has a submerged entrance in the lower part of the slag layer. This increases the distance the feed has to take to exit the furnace and prevents feed bypass during continuous operation. This also allows for separate slag and metal tapping if required. The return path for the current is through a permanent liquid metal pool contained within the conductive hearth of the furnace in electrical contact with several large current collectors/electrodes. This protects the hearth and electrodes from the arc and protects the electrodes from melting and alloying with the melt pool.

Tetronics' technology is mature and has been successfully employed in a range of environmental applications. Most are associated with the treatment of wastes and have been operated on a commercial scale for decades.

Contact Tetronics to find out how we can assist with your base metal recovery challenge.

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:

a leading engineering, project management and technical advisor to the waste management, process and renewable energy sectors.

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