



# PASO

## Plasma-Assisted Sludge Oxidation

### *Innovative sludge treatment technology*

The management of organic sludge produced by pulp and paper mills, the agrifood industry, farms, water purification plants and other sources raises major issues worldwide given the increasing amounts of sludge produced, and the serious economic and environmental constraints associated with conventional disposal methods such as incineration, landfill, and land spreading.

Developed by a team of industrial applications specialists from Hydro-Québec's Shawinigan laboratory and marketed by the Québec firm Fabgroups Technologies, plasma-assisted sludge oxidation (PASO) has now become a real alternative to conventional treatment methods.

### *Innovation in treating sludge*

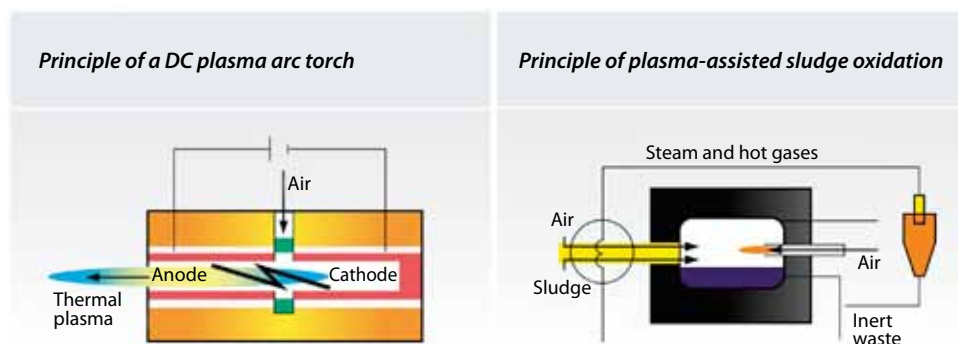
PASO is an incineration technique that uses an atmospheric-pressure rotary kiln operating at a moderate 600°C and equipped with a low-power plasma arc torch. The plasma arc supports oxidation by catalyzing the destruction of organic matter contained in biological sludge.

### *Features of the rotary kiln*

- > Low-power air plasma torch
- > Operating temperatures of 500°C to 700°C
- > Kiln pressure slightly below atmospheric pressure
- > Continuous operation
- > No melting or sintering of inert waste
- > Use of inert waste to transfer heat
- > Consumption below 125 kWh per wet tonne (sludge with 20% or higher organic content)

This energy-efficient process consumes less than 125 kWh per wet tonne of sludge and thus uses the energy from its organic content as the main source of heat. Sludge with 20% organic content by weight produces enough energy when burning to evaporate the water and heat by-products.

Furthermore, the ash that accumulates in the kiln acts as a heat transfer medium between the kiln walls and newly loaded sludge. Lastly, some of the air required to oxidize the organic load is directly used as plasma-forming gas.



### Significant advantages

Based on the use of thermal plasma, PASO consumes little energy and has distinct advantages over incineration, landfill and land spreading, including the following:

- > Sludge 95% more compact after treatment
- > Low-energy, or even autothermal, process
- > Heat recovery possible as hot air, hot water or cogenerated electricity
- > Treatment of sludge with 20% or higher organic content
- > Complete destruction of pathogenic compounds
- > Potential use of inert waste
- > On-site treatment

PASO technology, covered by a 2001 marketing agreement between Hydro-Québec and Fabgroups Technologies, a manufacturer specialized in equipment for the environmental and pulp & paper sectors, has great commercial promise.

### Applications

- > **Pulp & Paper** - Primary and secondary sludge
- > **Municipal services** - Sludge from wastewater treatment plants
- > **Agribusiness** - Sludge containing fats, proteins and carbohydrates
- > **Other areas related to the environment** - Stabilization of wastes
  - Sludge with high levels of contaminants

### For information:

#### Research

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