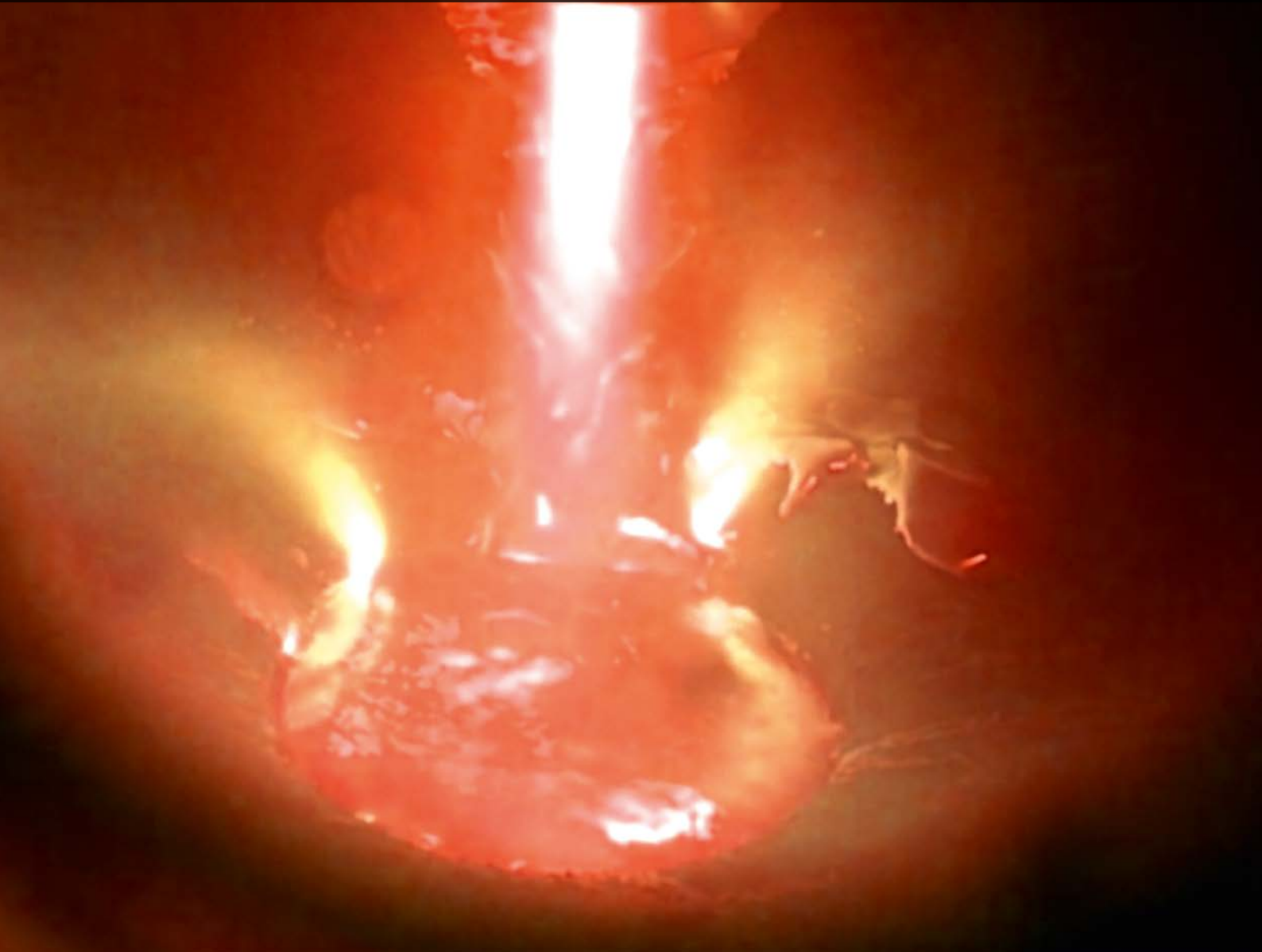


**ALD Vacuum Technologies**

High Tech is our Business

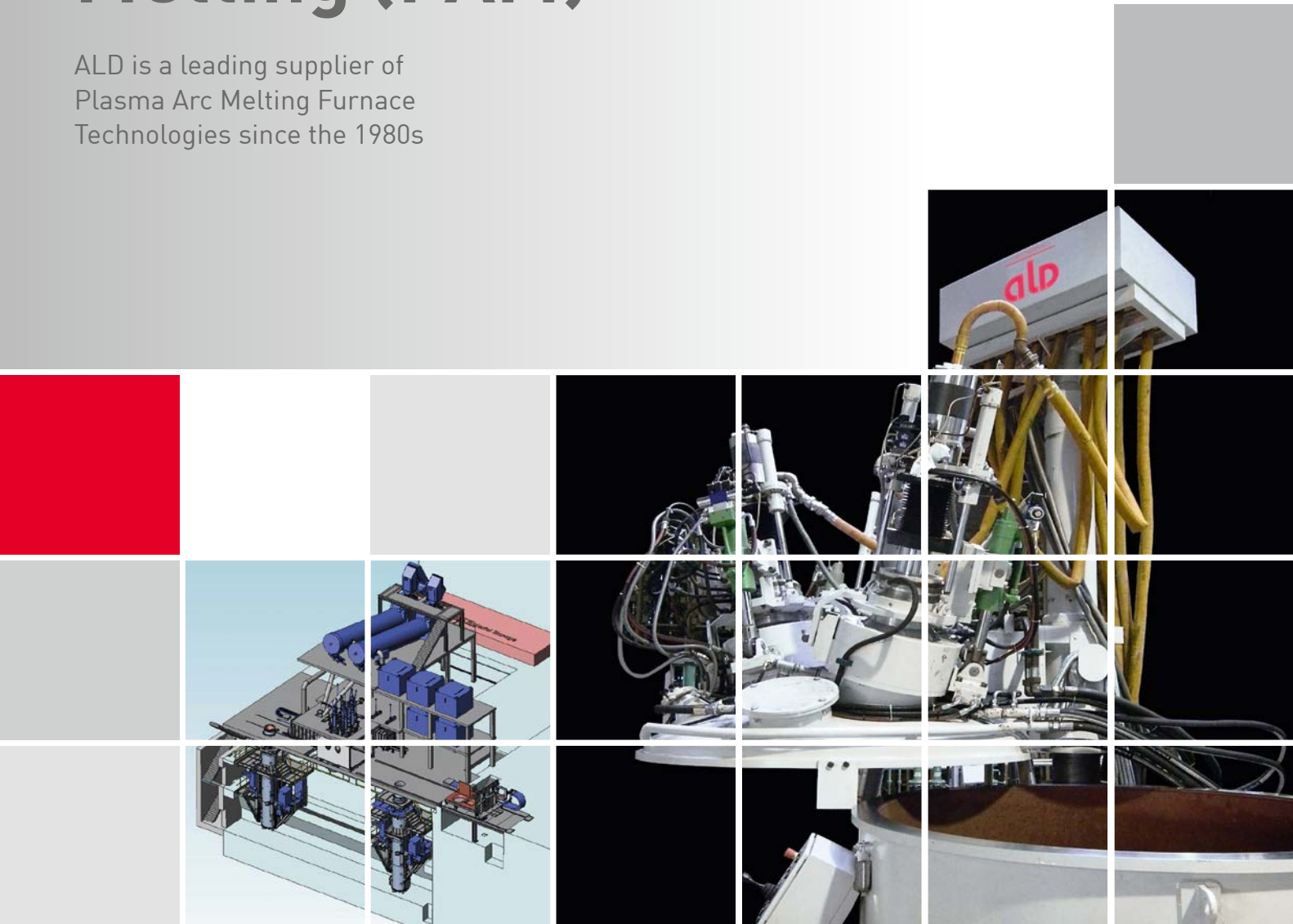
# Plasma Arc Melting (PAM)

Plasma Arc Melting Processes and Furnaces



# Plasma Arc Melting (PAM)

ALD is a leading supplier of Plasma Arc Melting Furnace Technologies since the 1980s



For melting and remelting of Titanium-Alloys, e.g. Titanium Aluminides, containing larger amounts of alloying elements with high vapor pressure that would evaporate under deep vacuum, the plasma arc melting process is the first choice.

Using plasma arc melting, the metal is melted under inert gas atmosphere (usually Helium or Argon) in a pressure range between 300-1,000 mbar abs.

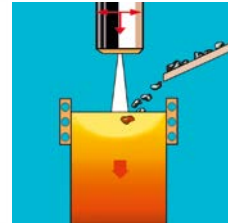
The plasma arc torch column (partly ionized inert gas) provides the heat source. Under these process conditions, evaporation of alloying elements can be suppressed and complex alloy composition can be maintained.

## PAM Process

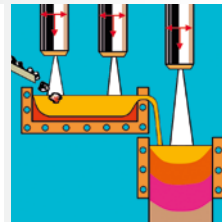
- Typical grades: Ti-Alloy / Ti-Al
- Helium or Argon inert gas atmosphere
- Melting pressure 300-1,000 mbar abs
- Easy chemistry control
- Cold hearth refining possible
- Ingot diameter = 50-1,000 mm
- Ingot weight = 5-15,000 kg

# Versatility of the Plasma Process

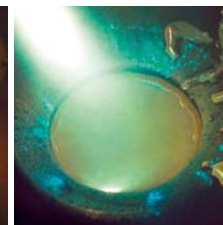
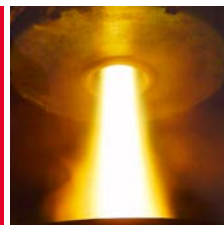
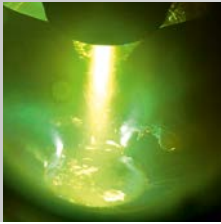
Consolidation



Cold Hearth Refining



Plasma Inert Gas Atomization



## Versatility of the Plasma Process

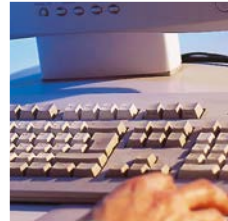
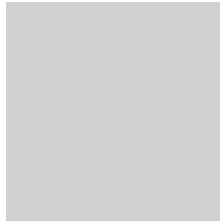
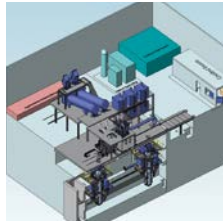
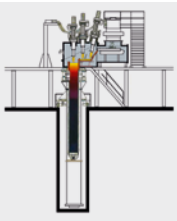
- Welding (e.g. Titanium sponge compacts)
- Consolidation (e.g. Titanium sponge or revert material)
- Homogenization
- Refining (Cold Hearth Refining Furnace for production of Ti-Alloy material)
- Recycling (Ti-Alloy revert material)
- Atomization
- Incineration

## ALD Plasma Torches

- Power range 35-2,000 kW (5kA max.)
- Various torch / electrode design (depending on power / application)
- Transferred mode operation
- Plasma gas: Helium, Argon, Helium / Argon mixture
- Pressure range: 300-1,000 mbar abs
- Maintenance friendly design
- Enhanced lifetime of torch consumables

# ALD: The Single Source Provider

As the single source provider for Plasma Furnace Technology, ALD is able to supply the complete Plasma Furnace System installation with suitable torches and controls as well as the necessary closed-loop plasma gas recycling and purification system. Thus only small amounts of the expensive pure inert gas have to be added in order to compensate process related losses. In addition, process support can be provided by ALD's process specialists.



## ALD: The Single Source Provider

Effective degassing / distillation

- Plasma Furnace
- Plasma Torch and Power Supply
- Plasma Furnace Control and Process Data Acquisition
- Plasma Remelting Process Support
- Plasma Gas Recycling and Purification System
- Auxiliary Equipment (e.g. Cooling Water Circuits, Step Down Transformers, complete Vacuum System, ...)
- Installation supervision or even "Turnkey-installation"



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