Vacuum Systems and Technologies
for Metallurgy and Heat Treatment
Worldwide Leading

Our Market Position

ALD Vacuum Technologies is a market leader in vacuum systems and process services for thermal and thermo-chemical treatment of solid and molten metals.

Our Process and Equipment Portfolio

Our engineering expertise includes
- vacuum process technology
- know-how to design customized system solutions for

Vacuum Metallurgy

Vacuum Heat Treatment and Sintering

Nuclear Fuel Production and Waste Management
Vacuum Metallurgy

Vacuum metallurgy involves vacuum processes for treating molten metals such as melting and remelting, casting and metal-powder technology as well as specialized vacuum coating technologies for high temperature turbine components.

Applications
Examples of products that were developed using ALD’s advanced vacuum processes include:
- highly alloyed special steels and superalloys
- refractory and reactive metals with ultrahigh purity
- fine-grain precision castings with directional and single-crystal structures
- forgings with near net shape
- semiconductors for solar cells
- high purity powder for homogeneous and high strength parts
- additive manufacturing
- plasma spray coatings

System Portfolio
ALD offers modern, efficiently functioning production systems which significantly contribute to the cost-effectiveness of a high quality production. It covers the complete range of sophisticated metal making processes like:

Primary Melting and Secondary Remelting
- Vacuum Induction Melting and Casting (VIM/VID/VIDP)
- Electro Slag Remelting (ESR)
- Vacuum Arc Remelting (VAR)
- Electron Beam Melting (EB-CHR)
- Plasma Melting (PAM-CHR)

Casting and Coating
- Vacuum Induction Melting – Investment Casting (VIM-IC)
- Cold-Wall Induction Melting and Casting (LEICOMELT)
- VAR Skull Melting and Casting (VAR-SM)
- Vacuum Turbine Blade Coating (EB/PVD)

Photovoltaic
- Solar silicon melting and Crystallization Unit (SCU)

Powder Atomization
- Vacuum Induction Melting Gas Atomizer (VIGA)
- Electrode Induction Melting Gas Atomizer (EIGA)

Special Furnaces
- Hot Isothermal Forging (HIF)
- Induction Heated Quartz Tube Furnace (IWQ)
- High Vacuum Resistance Furnace (WI)

Turn-Key Solutions

Research and Development
Vacuum Heat Treatment and Sintering

Vacuum heat treatment processes of ALD are used whenever high performance properties are required for tools, transmissions, precision engine parts and fuel injection system components.

### Process and Furnace Portfolio

**Vacuum hardening, tempering and brazing of**
- tool steels and other metals, in vertical or horizontal batch furnaces

**Vacuum carburizing and high pressure gas quenching furnaces from ALD**
- MonoTherm® for aerospace applications
- DualTherm® for multi-purpose applications
- ModulTherm® for modular and flexible heat treatment in large scale-production
- SyncroTherm® for full integration in the manufacturing line

They all feature dry, high pressure gas quenching which
- saves subsequent cleaning steps
- reduces distortion of the quenched parts
- minimizes or eliminates costly hard surface machining

**Vacuum sintering furnaces**
- for sintering high-strength cemented carbides and special oxides
- for vacuum or high pressure (HIP) up to 100 bar

**Vacuum nitriding furnaces**
- for gas nitriding processes in NitroTherm® furnaces
- for active screen plasma nitriding (ASPN) processes using the ION₂-cloud® technology

### Engineering Services

ALD’s own competence center offers customized Development & Engineering Services

### Nuclear Fuel Production and Waste Management

ALD’s modular pusher type sintering furnaces are used for the production of nuclear fuel pellets such as UO₂ and MOX. ALD also offer solutions for volume reduction, de-contamination and recycling contaminated metal scrap.

The company developed an Impermeable Graphite Matrix (IGM) as a method to embed contaminated radioactive graphite waste materials to ensure safe isolation from the biosphere for millions of years.
Our Expertise

New processes are being continuously developed that will yield improved quality, efficiency and the opportunity to produce entirely new materials. Each of these unique technologies offers different benefits, partially overlapping each other in their technical and economic potentials.

ALD has the experience and expertise to work in close cooperation with its customers to select and customize the appropriate process and equipment technology for their highly specialized applications.
ALD Vacuum Technologies Worldwide

ALD Vacuum Technologies in Hanau, Germany, is the leading global supplier of process technologies, furnaces and services in the field of vacuum metallurgy and vacuum heat treatment. With subsidiaries in the USA, Japan, Russia, China, India, Mexico, France, Poland, Thailand and more than 20 representative offices, ALD is a worldwide supplier to industries e.g. power generation, environment, aviation, photovoltaic and automotive suppliers.

You can find the addresses of all our sales partners and subsidiaries on www.ald-vt.de.