aarding thermal acoustics was established in 1960 and has grown to a strong and flexible company. our strength comes from our extensive know-how on a wide variety of acoustical components and gt exhaust systems.

our customers are gas turbine manufacturers, power producers or contractors. whether a problem can be solved from our standard product line or needs a tailor made solution, aarding thermal acoustics takes control from design to installation. even for complex turn-key retrofit projects.

aarding thermal acoustics is management owned therefore we can operate flexible and fast on customers demand. it is no surprise that we have grown into an international corporation as the trusted name for acoustical components and gas turbine exhaust systems for power plants.
The current market environment is pushing the operational conditions of Industrial Gas Turbine systems to its limits. High cycling (high numbers of starts and stops) as well as high local flue gas velocities and temperatures are putting large stresses on the exhaust gas systems.

Environmental regulations require stringent and lower noise levels on gas & steam turbine driven systems as well as on petrochemical applications.

Aarding Thermal Acoustics is an established, independent and privately owned company with its headquarters in the Netherlands and supporting offices & partners worldwide (USA, Latin America, Eastern Europe/ Russia, Middle East and Asia).

Based upon a proven track record Aarding Thermal Acoustics provides customized and turn-key solutions. Our scope includes; Design, Engineering, Manufacturing and Supply of:

1. Gas Turbine Exhaust Systems
2. Diffusers, Plenum and Gas Turbine Exhaust ducts
3. Single cycle exhaust systems
4. Bypass Exhaust systems
5. Exhaust Stacks
6. Thermal Insulation
7. Boiler Internals
8. Vent silencers for steam and gas applications
9. Inline diffusers
10. Flue gas silencers
11. Commissioning silencers

Both New as well as Upgrade / Retrofit systems Design and Engineering is realized in-house by our teams of experienced engineers specialized in mechanical, thermal and acoustical engineering dedicated for the Power and Petrochemical Market.

Manufacturing is realized worldwide, providing the most economical solution and optimal logistical project realization. All systems are manufactured according to strict quality levels and standards and manufacturing supervision and quality control is realized by experienced Aarding Inspectors.

(*) All major gas turbine, HRSG and petrochemical systems.
**DIFFUSERS / PLENUMS (1)**

One of the major transition areas between the gas turbine exhaust and the exhaust system is the diffuser duct or gas turbine exhaust plenum duct section. On the larger & newer type IGT’s the exhaust gas flow is directed into the exhaust system through a diffuser duct (straight flow) and on some specific type IGT’s through a gas turbine exhaust plenum duct section changing direction of flow into a 90 degrees bend.

For both systems Aarding Thermal Acoustics provides diffusers and plenums specifically engineered to cope with the strong GT exhaust gas swirl characteristics as well as the high GT exhaust gas velocities and temperatures. To accommodate start stop operation as well as operation at elevated temperatures, Cold casing designs specifically engineered for the applicable operational conditions are the current standard.

---

**GT EXHAUST DUCTS (2)**

Exhaust ducts are mainly applied as transition between diffuser and diverter systems or between the diverter system and HRSG (inlet ducts). Main design focus is related to the high swirls, exhaust gas velocity and elevated temperatures.

Aarding Thermal Acoustics designs and provides the latest cold casing design adapted to today’s stringent operational conditions. Ducts are commonly engineered including additional features such as dedicated silencer assembly supporting systems Accommodating high gas flows and start stop operation), turning vanes, fast opening & closing access doors and compensator connection flanges. In addition, all systems are designed to meet both thermal (maximum surface temperatures) and acoustical (noise levels) requirements based on either local or governmental requirements.

---

**GT EXHAUST SYSTEMS**
SINGLE CYCLE EXHAUST SYSTEMS

In today’s energy market there is a growing demand for peaking power. Simple cycle operation is a fast and reliable way to provide flexible power demand at short notice. Aarding Thermal Acoustics provides a range of alternatives on simple cycle exhaust systems which will support effective cyclic operation and the changes in thermal load which are part of the frequent start-stop cycles.

Each design is individually designed for internal stud spacing, stud size, liner plate thickness, to ensure the best operational conditions and unit lifetime.

Aarding Thermal Acoustics will do the design, manufacturing, and supply of the complete scope of supply from the inlet expansion joint through the stack exit. Our in-house acoustical capabilities are backed up with extensive laboratory and field measurements which allow us to develop state of the art solutions for your noise control requirements.

Aarding has extensive experience in the supply of simple cycle exhaust systems and supplies either sections of the system up to the complete exhaust systems including on-site erection and commissioning.
BYPASS EXHAUST SYSTEMS

To realize higher efficiency levels gas turbine waste heat is used to generate process steam or steam turbine operation. Aarding Thermal Acoustics provides Bypass Exhaust Systems between gas turbines and HRSGs. These Bypass systems allow flexible operation of the power island as well as the capability of starting the gas turbine in rapid starting mode and allowing the HRSG to gradually come online. This approach gives offers the flexibility of fast power and increases the life of an HRSG. In today’s business environment bypass exhaust systems provide a solution for the option between baseload and peaking/modulating operation.

Aarding Thermal Acoustics Bypass Exhaust Systems and fitted with state of the art diverter systems from our partners in the USA and Canada. The diverter valves can be designed as pivot or toggle type and can accommodate both hydraulic and electric drives. With optional seal air systems zero leakage and a man safe environment for any maintenance to the HRSG can be provided.
Advanced type gas turbine operation requires high performance of the insulation systems, silencer assemblies and supporting systems of Exhaust stacks. Noise regulations often demand complex design silencer systems and turbine exhaust gas temperatures require a dedicated thermal design.

Existing and ageing stacks often show extensive wear since most older designs have difficulty coping with the current operational strains.

Aarding Thermal Acoustics has developed effective internal stack insulation systems and can offer a combination of the most economical and effective stack system including stack design, support structures and auxiliaries as well as a silencer system which will offer both long term operation as well as excellent mechanical performance. A complete scope can be supplied including silencers, stack dampers, FAA lights, lightning protection and other related requirements. Based upon our experience we are able to offer complete turnaround projects in line with industry requirements and leadtimes.

Aarding can supply the complete scope including silencers, stack dampers, FAA lights, lightning protection, and more.
INTERNAL INSULATION
Cold Casing Design
Aarding Thermal Acoustics has developed an in-house design of internal insulation systems based upon the latest operational requirements and newest materials. In our cold casing design, the insulation system is fitted to the casing interior using a custom designed support system. The protective sheeting is engineered based upon the most economical & effective distance (insulation thickness) from the cold outer casing wall by studs, nuts and washers enabling free thermal expansion of the metal sheeting in relation to the outer casing wall (floating plate principle).

Aarding Thermal Acoustics design includes:
- Lower exterior duct/casing temperatures resulting from the use of custom designed internal insulation
- Eliminating or reducing external duct sliding connections applying cold design
- Ease of maintenance as a result of sectional design of internal insulation and optimised field joint designs
- Minimizing external duct movement resulting in longer duct life and less strain on flexible joints/bellows
- Options to include higher temperature operation as a result of GT upgrade or installation of additional burner systems

With the experience of more than 750 references worldwide, Aarding has the know how to execute the complete engineering in-house in combination with the supply of the complete insulation package.

BOILER INTERNALS
Aarding Thermal Acoustics provides HRSG baffles. These baffles are normally located direct within the flow of hot exhaust gas through the heated surfaces of the HRSG / boiler (harps or modules). These baffles minimize gas bypassing the harps or modules and maximize the exchange of heat in the harps or modules where steam is generated.

Aarding Thermal Acoustics design includes:
- The most effective distribution of gas flow over the boiler tubes.
- The optimum flue gas velocity.
- Elimination of hot spots caused by bypassing flue gas.

Typical designs:
- Attic and basement baffles
- Sealing plates
- Side gas baffles
- Center gas baffles
- Flow baffles
- Sound baffles

With the experience of more than 750 references worldwide, Aarding Thermal Acoustics has the know how to execute the complete engineering in-house.
ATMOSPHERIC VENT SILENCERS

Aarding Thermal Acoustics atmospheric vent silencers are typically used in conjunction with a relief/safety valve or a start-up valve. Applications are in heat recovery systems, steam boilers, and at oil/gas/chemical processing plants. The Aarding Thermal Acoustics vent silencer effectively eliminates high, unwanted noise at the source and provides for low sound level discharge to the atmosphere. This type of design is a reactive/absorptive type of silencer.

Aarding Thermal Acoustics vent silencers are custom designed for each and every application ensuring the best acoustical performance and can be designed for any service conditions or flow rates from as low as 1,000 lbs/hr to upwards and exceeding 1 million lbs/hr.

COMMISSIONING SILENCERS FOR RENTAL

Aarding Thermal Acoustics commissioning silencers are designed for steam systems to vent down during commissioning allowing the systems to clean and to get rid of possible remnants & deposits present within the systems located upstream.

The Aarding Thermal Acoustics commissioning type silencer is designed to reduce noise pollution caused by high-pressure gasses rapidly venting to the atmosphere during commissioning. This silencer is custom designed to vent approximately 1.2 million lbs/hr of steam (depending on steam pressure/temperature) and provides 35-40 decibles of noise reduction. Additional reduction in total noise is achievable if required with an acoustic splitter package installed at the outlet of the silencer. This design with splitter package can provide for over 50 decibles of noise reduction.

The silencers can be rented for use during commissioning of new systems or after extensive maintenance activities. The silencer is skidded for shipment and installation. The unit can be easily installed and connects the supported and restrained.

IN-LINE DIFFUSERS

The Aarding In-Line Diffuser assembly is designed to reduce the noise typically associated with pressure reducing valve applications. These inline diffusers are of the diffusing type designed for the reduction of excessive noise from pressure reduction systems for steam, gas, air, or other mixed gas type services and are especially effective when used in combination with a valve to achieve and/or share the total pressure drop required by the system.

The in-line diffusers provide several functions:
- Dispersing high pressure reductions typically seen at pressure reducing valves and regulators, and air cooled condensers down to vacuum conditions.
- Dissipating high energy noise and reshaping the frequency spectrum, shifting the peak frequency to a higher octave band.
Flue Gas Silencer

Aarding Thermal Acoustics flue gas silencers are custom designed to keep noise emissions within acceptable levels. Current gas turbine operation requires the latest design, engineering and advanced material selections.

Whether flue gas silencers are mounted in a silencer duct, a hot or cold stack or have to be able to operate in high flue gas velocities or elevated and fluctuating temperatures (start-stop mode), Aarding Thermal Acoustics can provide the most effective solution in line with Gas Turbine output and Single cycle or bypass/HRSG design considering basic design criteria such as:

- Sound power level/noise output of gas turbine
- Noise requirement of power plant required
- Dynamic insertion losses of silencer
- Pressure drop requirements
- Dimensions of duct/stack
- Other noise sources, e.g. burners
- Other noise reducing parts of the system, e.g. Boiler & elbow
- Maximum flow velocity

The Aarding Thermal Acoustics Flue Gas Silencer offers the following advantages:

- In-house design by our team of acoustical engineers & experts
- Most effective and economical design
- Patented designs
- Fabrication based upon a full welded construction

Aardings Flue Gas Silencers have been designed by our in-house team of acoustical engineers & experts
MARKETS

Aarding Thermal Acoustics provides products and services from to the following markets:

- Power Energy Market
- Petro Chemical Market
- Aero Engine Market

POWER ENERGY MARKET
Within the Power Energy Market, the products of Aarding Thermal Acoustics can be placed within:

- Coal Fired Power Plants
- Gas and Oil Fired Power Plants
- Nuclear Power Plants

Aarding Thermal Acoustics supplies worldwide the products to end-users, EPC’s, turbine suppliers, boiler suppliers and engineering-contracting companies for eventual balance of plants solutions.

PETRO CHEMICAL MARKET
Where there over pressure of several gasses is applicable, the products of Aarding can be delivered.

AERO ENGINE MARKET
Aarding Thermal Acoustics provides new as well as retrofit silencer and exhaust systems for Aero Engine test cells and hush houses.

Major strength of Aarding Thermal Acoustics is an extensive experience and in-house engineering and engineering techniques providing solution driven designs, products and services. Aarding Thermal Acoustics focus is on high temperature insulation applications and acoustic engineering.
Aarding Thermal Acoustics provides products and services both for new projects as well as within the service and retrofit markets.

Today’s changing market conditions with a growing and ageing fleet of heavy industrial equipment and requirements for a higher flexibility and higher output is stretching the boundaries of component life. Aarding offers a range of services either extending life, upgrading or retrofitting existing exhaust gas systems and acoustical systems.

Many older type Gas Turbine units face extensive wear and tear in the exhaust system. Minor defects in the insulation package often result in a fast and widespread damage increasing the number of trips and reducing availability.

Repair on these ageing exhaust systems has its limitations as a result of damages by hot spots and progressive base material degradation. As a result patch up repairs will not provide an effective operational solution and upgrade or replacement are the only options for life extension of the system.

Aarding Thermal Acoustics provides engineering solutions including upgraded materials, a better insulation package and advanced engineering simulation techniques to ensure effective thermal and acoustic design of the exhaust system.
Our strength comes from our extensive know-how on a wide variety of acoustical components and GT exhaust systems.