

Mechanical Engineering

Industrial facilities and power plants benefit from seasoned mechanical engineers who are skilled in a broad range of disciplines. The design services and operations and maintenance support that GAI Consultants offers for building, in-plant, and power generation challenges keeps boiler systems, gas compressors, and entire manufacturing facilities and power plants operating efficiently. GAI's solutions improve efficiencies and reduce costs with a focus on preventative maintenance and safety.

Years of experience, knowledgeable teams of innovators, sector-specific familiarity, and multidiscipline in-house resources means practical and cost-effective solutions delivered seamlessly.

Professionals that have career-long familiarity with industrial processes are the earmark of GAI's ability to provide mechanical engineering solutions that are both cost-effective and innovative. The applications we address for industrial processes include pump, motor, mechanical seal, air compressor, rotary lube blower, gearbox, instrumentation, and steam turbine design.

GAI designs practical piping solutions for compressed air and steam lines, industrial processes, manufacturing and food processing plants, power generation facilities, and water and wastewater treatment systems. Our design

packages include specifications for instrument and control equipment, pumps, vessels, tanks, process equipment, and conveyor systems. We design vessels in accordance with ASME codes and standards, and tanks in accordance with American Petroleum Institute (API) standards.

Engineers specializing in boiler systems test boiler efficiency, troubleshoot poor performance, make recommendations for operational efficiency, and conduct combustion safety reviews. GAI educates clients' employees on the systems we develop and provides training for maintenance and safety.

GAI designs waste-to-energy facilities that reduce carbon footprint and landfill overflow. We specialize in air pollution control and keep facilities, including bag houses, spray absorbers, fume incinerators, and flare stacks, compliant with federal and state regulations.

From equipment selection and sizing to utility pipe system mapping, stress analyses, and distribution verification, GAI's electrical, structural, civil, and geotechnical engineers support our mechanical engineering staff. We deliver comprehensive solutions, from analysis and planning to startup and commissioning, that keep facilities running efficiently.

Pairing the skills of mechanical, structural, and electrical engineering professionals, GAI delivers a full array of disciplines to meet our clients' industrial and energy plant design and maintenance needs.



gai consultants®

Service Profile



Mechanical Engineering Services

- HVAC load calculation, system life-cycle cost analysis, constructed cost estimation, and design; equipment sizing and selection for industrial and commercial facilities
- ICC building code compliance studies
- 2D/3D AutoCAD and Microstation drawing creation and 3D Revit modeling capability
- Utilization of 3D scan data in design models to coordinate for existing conditions and avoid interferences in design and construction
- Construction administration
- Plumbing system sizing and construction drawings for sanitary, storm, domestic hot/cold water, natural gas, and compressed air piping systems
- Fluid dynamics simulation for optimization of piping systems and pump selection
- Fire protection, fire hazard analysis, and fire service system sizing
- Finite element analyses
- 3D machine design and modeling
- Facility piping and valve mapping
- Energy conservation studies and planning
- Combustion system design and safety review
- Steam and air load analysis and system sizing
- Equipment and facility layout

Industrial, Electric Energy, and Power Generation Systems Services

- P&ID and PFD development and drawings
- ASME safety device sizing
- PHA, HAZOP and regulatory compliance support
- ASME B31.1, B31.3 and PBE piping design
- Pipe stress and flow analysis and support design
- API tank and system design and analysis
- Combustion fuel systems and equipment
- FGD ductwork and wastewater treatment systems
- Air, dust and ash, and slurry handling systems
- Solid/liquid bulk conveyance and storage systems
- Baghouse ductwork systems and scrubbers
- Procurement services
- Shop fabrication review, inspection, approvals
- Construction monitoring, inspection, management

GAI Services Summary

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| <ul style="list-style-type: none"> ■ Airport Planning and Design ■ Bridge and Structure Inspection and Design ■ Coal Combustion Residuals Management ■ Construction Inspection and Management ■ Cultural Resources Management ■ Economic Analyses and Strategies ■ Electric Transmission Design and Siting ■ Environmental Engineering ■ Environmental Studies, Species Studies, Permitting ■ Gas Pipeline Surveying and Mapping ■ Geographic Information Systems (GIS) ■ Geotechnical Engineering and Geology | <ul style="list-style-type: none"> ■ Impoundment and Landfill Permitting and Design ■ Land Development Engineering ■ Landscape Architecture and Design ■ Master Planning and Urban Design ■ Mechanical, Electrical, Structural Engineering ■ Natural Gas FERC Certification and Permitting ■ Nuclear Energy Engineering Support ■ Right of Way and Appraisal Support ■ Land Surveying and Mapping ■ Transportation Planning and Design ■ Utility Management Consulting ■ Water, Stormwater, Wastewater Management |
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The scope of professional services that are provided by or offered out of each GAI office including, but not limited to, engineering and surveying services, is governed by the professional and business licensing requirements of each individual State or jurisdiction in which the GAI office is located and whether GAI has the requisite professional and business licenses for that State or jurisdiction. Nothing on GAI's Web Site or marketing materials is intended to be interpreted or construed as offering to perform professional licensed services where prohibited unless the licensing requirements have been met. Surveying services are not offered out of GAI's Kentucky location.