Elliott Boil Off Gas Compression Solutions
Optimizing Efficiency in Elliott BOG Off Gas Compressors

The accessibility of huge global reservoirs of natural gas has pushed natural gas into a prominent position as an abundant, low-cost, and low-carbon fuel. As natural gas becomes a bigger player in global energy production, better, more efficient methods are needed for storing and transporting liquefied natural gas (LNG).

Maintaining LNG in its liquid form at low pressure requires extremely low temperatures. Handling boil off gas (BOG) is inherent to the process. During LNG storage and transportation, as surrounding temperatures cause the LNG temperature to slowly rise, the LNG begins to evaporate or “boil.” The expanding vapor causes the pressure to rise, and must be removed to maintain safe pressure levels inside the tank. The “boil off” gas is routed through a boil off gas compressor.

Adjustable Inlet Guide Vanes (AIGVs)

There are two common methods for controlling the mass flow and discharge pressure in a BOG compressor running at a fixed speed: 1) suction throttling control valves; or 2) adjustable inlet guide vanes (AIGVs). A suction throttling control valve is installed at the inlet pipe to restrict mass flow and lower the pressure immediately upstream of the BOG compressor. Alternatively, AIGVs are installed inside the compressor, just ahead of the first compressor stage to control the flow direction into the first impeller. While AIGVs are moderately more complex than suction throttling control valves, they provide greater range of flow. Most importantly, AIGVs maximize off design efficiency by minimizing pressure loss compared to a suction throttle approach, resulting in lower power consumption.

To ensure the efficiency of Elliott BOG compressors, we’ve developed and tested a new type of AIGV system to accurately and efficiently control mass flow and pressure at extremely low temperatures (-300°F). Elliott AIGVs enable a wide performance range (-20° to +70°), with a patented control mechanism that maintains a consistent vane angle with no slippage, load transfer or gear backlash. A flexible configuration is adaptable for use on ships and in on-shore offloading facilities.
**Elliott AIGV Features and Benefits**

- Aerodynamic vane design ensures optimal flow path.
- Turndown angles enable a wide performance range (-20° to +70°).
- Patented control mechanism eliminates slippage, load transfer and gear backlash.
- Direct drive control maintains consistent vane angle.
- Specialized low-friction coating protects the control mechanism at cryogenic operating temperatures.
- Top half of casing can be removed without disassembly of AIGV hardware for easy maintenance.
- Typical cycle rate incorporated in design to provide 10 years of trouble-free operation.
- Flexible configuration easily adapts for use on ships and in on-shore offloading facilities.

Elliott AIGVs are available for Elliott M-line centrifugal compressors, frame sizes 20M to 56M (~2,900 to 59,000 acfm).
Elliott Group is a global leader in the design, manufacture and service of technically advanced centrifugal compressors, steam turbines, power recovery expanders and axial compressors used in the petrochemical, refining, oil & gas and process industries, as well as in power applications. Elliott Group is a wholly owned subsidiary of Ebara Corporation, a major industrial conglomerate headquartered in Tokyo, Japan.