# Clean Steam & Maximum Power for Geothermal Applications

Steam Separation Solutions for Geothermal Power Plants

CECO ENVIRONMENTAL



*Geothermal steam systems face extreme challenges: moisture carryover, silica scaling, corrosive fluids, and turbine blade erosion. Peerless separation technologies deliver clean, dry steam to protect critical equipment and support reliable, high-output plant operation across flash steam, binary cycle, and dry steam applications.*

## A TRACK RECORD BUILT ON RESULTS

| 40+ | 30+ | 99.9% |
|---|---|---|
| YEARS GEOTHERMAL EXPERIENCE | WORLDWIDE PROJECTS | STEAM QUALITY ACHIEVED |

## SEPARATION PRODUCTS

### Wellhead Steam Separators

Remove liquids and solids from geothermal steam at the source - maximizing steam dryness, minimizing pressure drop, and reducing downstream carryover before steam reaches the turbine.

### Turbine Inlet Scrubbers

High-efficiency vane and cyclonic technologies protect turbine blades against particulate contamination, droplet impaction, and mineral deposits at the turbine inlet.

### Vane Separation Technology

100% removal of droplets 8 microns and larger. Low pressure drop, compact footprint, no moving parts — proven in high-temperature geothermal service.

### Cyclone Separation Technology

Centrifugal swirl tube technology for efficient liquid and solid removal across variable flow conditions. Compact vessel design adaptable to flash and dry steam systems.

***Also known as:*** *steam scrubbers & purifiers, vane mist eliminators, multi-cyclone scrubbers, gas/liquid separators, coalescers, and process filtration systems.*

## PERFORMANCE TABLE

**"Why Steam Quality Matters / Performance Overview"**

Steam quality directly affects plant performance and equipment life across the full facility:

| WHY STEAM QUALITY MATTERS | SEPARATION PERFORMANCE | OPERATIONAL IMPACT |
|---|---|---|
| **Reduced mineral deposits** | 100% removal of liquid droplets ≥ 8 microns | Improved turbine blade balance and Heat Exchanger efficiency |
| **Reduced erosion and corrosion of piping** | High-efficiency liquid slug removal | Reduced piping repairs |
| **Increased Steam Turbine efficiency** | Stable performance during load changes and transients | More Megawatt power output |
| **Extended operation between shut-downs** | Optimized pressure drop across all conditions | Less frequent maintenance shutdowns |

## RETROFIT SOLUTIONS



### Retrofit Solutions for Existing Vessels

Modern retrofit internals improve moisture separation efficiency and extend equipment life. Many upgrades install without welding to the pressure boundary, enabling fast turnaround and fewer inspections.

- Increase plant output and uptime
- Avoid full vessel replacement
- Reduce scaling, corrosion, and erosion
- Lower long-term maintenance costs

> *"Many upgrades install without welding — enabling fast turnaround and fewer inspections."*

## TECHNICAL SPECS + ENGINEERING & GLOBAL SUPPORT

### Built for Demanding Geothermal Conditions

| Parameter | Specification |
|---|---|
| **Steam Type** | Flash steam, binary cycle, dry steam |
| **Solids Loading** | High; Rocks, silica and mineral solids |
| **Pressure** | High-pressure; ASME vessel design |
| **Temperature** | High-temperature geothermal service |
| **Flow Conditions** | Variable; wet steam and two-phase service |



### Engineering & Global Support

#### Peerless Separation

- Process design with performance warranties.
- CFD simulation and flow analysis.
- ASME mechanical vessel design and fabrication QA oversight.
- Startup and commissioning support.
- Proprietary multi-stage separation internals.

#### Global Manufacturing Network

- Engineering centers: USA, China, Singapore, Dubai, Pune.
- Worldwide fabrication network.
- Local content maximization where required.

## WHY PEERLESS?

### Why Peerless for Geothermal Steam Separation?

*"With more than 40 years of geothermal separation experience and a global installed base spanning Asia, North America, and other key geothermal markets, Peerless delivers proven steam separation and filtration solutions that:"*

| | | | |
|---|---|---|---|
| **Maximize plant performance & power output** | **Protect critical turbine assets** | **Reduce operating costs & avoid unplanned downtime** | **Support long-term operational reliability** |

*Systems customized for flash steam, binary cycle, and dry steam geothermal operations and sized based on site-specific operating conditions and performance requirements.*

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