

MOISTURE SEPARATING ELEMENTS (CHEVRON VANES)



TEI
a Babcock Power Inc. company

OVERVIEW

THERMAL ENGINEERING INTERNATIONAL (USA) INC. (TEI), a Babcock Power Inc.® company, is a leading supplier of heat transfer technology to the electric power generation and industrial markets across the globe. Utilizing innovative technology and a team of skilled professionals, TEI has a powerful history of designing and fabricating feedwater heaters, steam surface condensers, Moisture Separator Reheaters (MSRs), waste heat boilers, fired heaters and other superior heat transfer equipment.

The finished chevron vane moisture separator assembly consists of (6) individual, designed and precisely formed parts known as the main vane, chevron vane spacer, end vane element, double bend vane element, leading single bend vane element, and trailing single bend vane element.

These parts are purposely built using laser cutting and hydraulic forming/pressing to shapes to fit a CNC machined jig fixture specific to TEI's automated chevron vane manufacturing process with a precision tolerance of $\pm 0.25\text{mm}$. Typically, TEI high-capacity, double pocket chevron vanes are provided in 304 or 430 series stainless steel. The individual vane elements are fit into TEI's jig fixture and then subject to an automated electric resistance spot welding process holding the gap and pocket depths that are the key functional requirements allowing the chevron vane assemblies to perform their moisture separation duties. The pockets coalesce and collect the moisture droplets, segregating the liquid phase from the gas phase of the wet steam. The chevron vane assemblies are packed together in vane banks structurally mounted into the MS system housed in the vessel at the appropriate location. The manufactured parts are engineered products with a very specific purpose.

SUMMARY

- The chevron vanes function as moisture separator elements in the vessel. The chevron vanes are situated on the shellside of the vessel, mechanically separating the moisture droplets from the wet fluid flow passing through the chevron vanes prior to flowing to the next process. By mechanically removing the moisture with the chevron vanes, the overall plant efficiency is improved.
- Chevron vanes allow the heat transfer process that occurs in the shellside of the vessel downstream of the chevron vanes to be more efficient.

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Babcock Power Inc. and its subsidiaries place the safety, health and security of our people at the core of our company values. Our team is our most valuable resource, generating solutions everyday to deliver safe, clean, reliable energy globally. With a keen focus on safety, Babcock Power Inc. conducts business in a manner that protects our people, our customers and the environment. From innovation to generation, we are proud of our award-winning safety record and are committed to operating with integrity and excellence.

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ADVANTAGES

- High Performance S.S. chevron vanes (moisture separation elements) and associated steam distribution system capable of achieving complete separation and removal of moisture as well as provide sound structural design, free of maintenance
- Ample inlet decoupling space to reduce the entering flow turbulence
- Elimination of Flow Accelerated Corrosion (FAC) in the shell and the internals.
- Elimination of all potential wet steam bypass lanes that reduce separation efficiency, by blocking gaps, controlling tolerances, and eliminating the susceptibility to thermally induced deformations
- Minimum pressure drops along the greatly simplified flow path and further streamlined the flow discontinuities employing an effective hydraulic design supported by model testing and proven
- Even distribution of the wet stream flow approaching the open face of the chevron vanes, by installing perforated plates and directional vanes near the inlet face of the chevron vanes
- Avoid inefficient water drops refracturing, by eliminating any sharp edges and corners
- Ample endurance to wet steam corrosion/erosion, by employing S.S. material, throughout, and by streamlining the flow path
- Structural integrity and reliability, supported by stress analysis and by experience
- Accessibility and visibility
- Achieve virtually 100% separation efficiency