



Case Study: Fabrication to Casting: EBE Venturi Orifice Steam Trap re-design creates market-leading solution

Converting fabrication to casting delivered:

- Higher quality
- Greater repeatability
- Economies of scale
- Lower production costs and less certification
- Exactly meets market requirements

The Background

EBE is a UK-based engineering business that specialises in venturi orifice steam trap design and steam system solutions. These are used in a wide variety of process engineering applications within the food and beverage, laundry, tyre and rubber, petrochemical, chemical and biomechanical markets. EBE's focus on design excellence and high-quality manufacturing results in solutions that are reliable and low maintenance while delivering both reduced energy costs and lower CO2 emissions.

The original venturi orifice trap distributed by EBE featured a cast stainless steel body with separate flanges. It contained a removeable orifice insert allowing for easy

maintenance without the need to remove the trap from the steam line. To meet the demands of the European market, however, the central casting required the welding of stainless steel flanges at both ends. In addition to adding cost and time to the production process, the welded joints needed to be checked and certified in accordance with the European Pressure Directives for devices operating in pressurised environments. The success of the innovative venturi orifice design, which is increasingly replacing traditional mechanical steam traps, has meant EBE needed to develop its product portfolio to make manufacturing processes as efficient as possible.

The Requirement

It was obvious to Nigel Egginton, MD at EBE, that while the existing unit met its functional design and performance requirements, it was expensive and time-consuming to produce. It also relied on castings produced by a third party supplier, which had added manufacturing and logistical complications in the past. So EBE reassessed every aspect of their product design and manufacturing process with the objective of evolving an already successful design into one which gave them a significant competitive advantage.



Image shows the innovative ECOFLOW Venturi Orifice Steam Trap

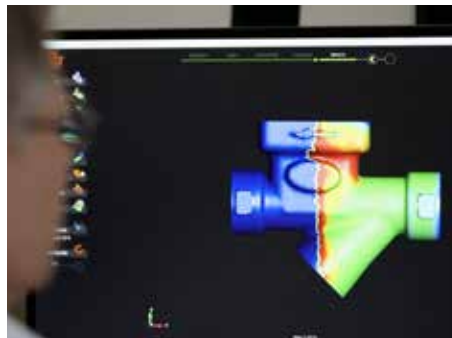


“Instead of ‘single manufacture many times’, we are now able to assemble and supply multiple units very easily.”

**Nigel Egginton
MD, EBE Engineering**

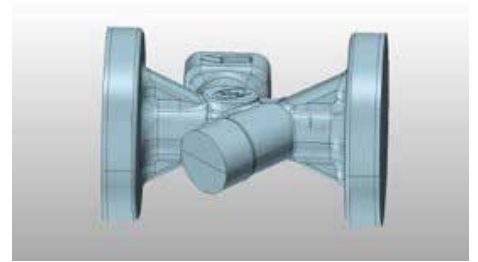
The Solution

As flanged connections were a requirement for the European market into which EBE exports a significant volume of venturi orifice steam traps, a key objective of the re-design was to incorporate the flanges into the main casting. This would deliver several benefits including simplification of the production process by eliminating the need for any welding, a reduction in the amount of machining required, a lowering of the manufacturing cost and the opportunity to benefit from economies of scale.



3D Modelling identifies and solves casting issues in component geometry

To realise these benefits, EBE needed to find a foundry capable of working with them to develop a casting geometry that would deliver the design improvements. It was critical that the quality of the Stainless Steel casting was high to ensure the integrity of the venturi orifice steam trap when working at high temperatures and pressures. This would also reduce the amount of machining required to achieve both operational performance and the required surface finish.



Isometric drawing produced for 3D printed sample

NovaCast was selected by EBE due to its extensive experience of converting fabrications into castings combined with its ability to deliver stainless steel castings of the highest quality.

Working closely together, the engineers at EBE and NovaCast developed and refined the casting geometry using 3D modelling and casting simulation software. A 3D printed prototype was then produced prior to full Stainless Steel production samples being commissioned. The combination of advanced computer modelling and 3D printing eased the process of developing, testing and refining the casting geometry and saved both time and cost.



Finished product cast as one piece in CF8 Stainless Steel



The Result

The objective was to take an already successful product and to refine its design and manufacture in order to deliver a market-leading solution. According to Nigel Egginton, the newly developed ECOFLOW Venturi Orifice Trap achieves all of his most exacting requirements and more. The new trap body offers a modular design to incorporate low and high flow in the same housing. A unique and innovative venturi extends the trap's performance over variable condensate loads. The EFK-F and EFG-F versions are investment cast in one piece using CF8 Stainless Steel giving them consistent strength, resilience and dimensional accuracy.

The body is now totally homogenous making it physically stronger and safer as all welding has been eliminated. This also simplifies certification, speeds up production and ensures repeatable, high quality.

From a commercial perspective, the new steam trap delivers a significant

technical advance on its predecessor but in a fully integrated flanged form that exactly meets market requirements. The streamlined manufacturing process enabled by the new design also allows EBE to pass on the benefits of economies of scale to its customers. As Nigel Egginton confirms, "Instead of 'single manufacture many times', we are now able to assemble and supply multiple units very easily. The enhanced scalability offered by the new design gives us far more scope to offer volume discounts to our customers".

Ultimately, the decision to re-evaluate every aspect of the trap design and manufacturing process, along with a willingness to work closely with a foundry highly experienced in converting complex fabrications into castings, has resulted in a truly unique solution. The new design delivers exceptional performance to EBE's customers as well as commercial competitive advantage for the company.

About NovaCast Limited

NovaCast has over 35 years of ferrous and non-ferrous metal casting experience extending into markets as diverse as transport, utilities, offshore and general engineering. The company's non-ferrous foundry, based in Melksham, England, is supported by a fully risk-managed supply chain that extends out to the Far East allowing NovaCast to provide a single source solution for precision cast and machined components.

NovaCast has particular expertise in the production of pressure-tight valve and industrial pump components, complex non-ferrous castings and a wide range of precision castings for many engineering applications. Metals cast include alloys of Carbon and Stainless Steel, Copper, Aluminium and many others. A full range of testing, machining, surface treatment and finishing options is also provided.

To discuss your requirements, call a member of NovaCast's team on +44 (0) 1225 707466 or email sales@novacast.co.uk

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