

"I've just had my first look at the components you produced for us and I'm staggered by the excellent job you guys have done.

They are the most impressive pieces we've seen on this project. The fitting team leader is hugely impressed by the quality of the finished product.

Well done, guys!"

**Design Engineer – Equipment producer
unsurpassed for critical applications**

About Copper Alloys Ltd

- Based in Stoke-on-Trent, England
- Producing speciality metals and components for critical engineering applications

Approach

- Created an innovative material production route to achieve sufficient hot working
- Risk mitigation strategy, openly communicated to customer
- Manage machining process closely
- Forward planning to ensure smooth inter-stage progression

Project Goals

- Manufacture forgings in largest-ever section
- Control complicated machining to achieve close tolerance
- Deliver within a tight timescale

Results

- Delivered one week ahead of schedule
- 100% compliance, zero concessions
- Customer "staggered by the excellent job"



British manufacturer Copper Alloys develops engineering solution to meet complex equipment challenge.

What was the project?

A marine defence equipment producer approached Copper Alloys with a unique problem: their customer had specified a component in a material that had never before been produced in such a large section.

The material was a high-strength cupro-nickel alloy to the defence standard DSTAN 02-835, which is typically produced up to 12" (305mm) diameter.

The component was a manifold block designed to operate under extreme stress which is part of a system that controls seawater at high pressure. The item was also a Class 1 component, which meant it was critical to the operation of the submarine. The section of the component was 16" cubes.

An elegant solution

With every quotation, Copper Alloys pre-plans the production route so that there are no surprises when orders are placed and projects can go live without delay. The production planning is entirely contained within Copper Alloys custom-built business management software package and was already complete when contracts were agreed.

There is full transparency of this process for clients, as the subsequent route card captures all of the requirements to the point of delivery and the post-project "lessons learnt" meeting.

Material creation

Eight ingots, each weighing 1500kg were cast and prepared for forging, taking care to ensure test samples were taken at the time to ensure full traceability back to the melt.

During the kick-off meeting, it was identified that if a forging or a component was scrapped further down the production process, then the impact upon the build programme would be unacceptable, as a replacement would take 12 weeks to produce. Therefore, to manage this risk, Copper Alloys produced enough material for two extra components should the need arise.

Component machining

Following a rigorous testing schedule, the forgings were proven to be high integrity and now focus shifted to the machining process. Taking a solid block weighing 550kg to a precision machined component weighing 130kg took the latest in CNC technology and hands-on management to ensure protocol was respected.

Risk mitigation

The scenario planning at the front end did prevent a problem becoming a disaster, as a forging was scrapped due to human error at the finish machining stage. As planned however, there was a forging available to slot into the process at no impact to the delivery schedule. Although this was not a requirement of the contract, Copper Alloys puts project delivery above profits, with the aim of continuing the development of our leading reputation as a deliverer of complex and critical projects.

A happy customer

Upon their customer's inspection of the pressure-tested components, they could see that the attention to detail and made the difference, down to the items coming pre-packaged with a sling to make it easy to lift them out of the boxes. These parts were "the most impressive pieces on the project".