



**FOR IMMEDIATE RELEASE – 2 January 2008**

## **The application of modular design to bespoke products**

**Traditional pump manufacturers have always approached the bespoke design of vertical sump pumps from the ground up due to the number of variants and components involved. With ever increasing pressures from contractors to shorten lead times, Amarith, a leading company specialising in the design, application and manufacture of pumps and associated equipment used in the petrochemical industry, decided to take a leaf from other engineering disciplines and develop the world's first modular vertical sump pump that could be configured to handle over 100,000 variants. Oliver Brigginsaw, Managing Director of Amarith explains how this was achieved.**

The traditional VS4 API 610 vertical sump pumps were always considered bespoke designs to fit the depth and working parameters of the application. Such designs were expensive and the pumps had a long lead time due to the engineering design time that went with each unique order.

Within the oil and gas industry in particular, as operators try to maximise the return from dwindling oil reserves and meet ever tightening regulations, there has been a marked increase for bespoke products to fit more flexible production practices, but delivered on reduced lead times.

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All the obvious efficiencies in the current bespoke design and manufacturing processes had been taken advantage of and so to meet the demands of the operators a fresh look at the overall development process for the vertical sump pump was required.

### **A modular approach**

The engineering time was a significant part of the overall time taken throughout the contract execution. Saving time here would be the biggest win in reducing the product lead time. The problem was how to standardise a bespoke product that had over 100,000 combinations.

We decided to adopt a modular approach. Although there were some 100,000 product variants of the vertical sump pump to consider, the designers were able to break the product down into just nine distinct modules.

Using computer-aided design tools, such as SolidWorks, engineers were able to model a range of standardised components as modules or sub-assemblies. Each module was checked against its mating parts for clashes using computer-aided design tools so that any variant assembled from the modules would fit together perfectly.

This modular approach now enables our designers to operate at an assembly level when delivering new designs allowing them to complete the design of a new pump using just nine modules rather than at a component level, which was the traditional way of designing such bespoke products.

### **Capturing intelligence in the model**

Furthermore, each component in the design has been turned into an “intelligent” part. Key data such as the component description and its sequence number (a number that helps to identify the part on a sectional arrangement drawing) is stored within the model. As the modules are brought together to form a complete unit, all of this additional data is automatically pulled in as well.

This has inevitably led to improvements in the consistency and accuracy when producing a sectional arrangement drawing, but the real saving has been in time. Previously, a sectional arrangement drawing for a bespoke product with many variants could take 3-5 days to produce. The new approach takes just 3 hours – in other words a saving in time of over 80%.

The modular approach has also led to a more streamlined bill-of-material and supply chain. As soon as the design is confirmed the majority of the bill-of-material will be available so that ordering of components can commence as soon as the contract has been confirmed.

Even “non-standard” designs can be easily and quickly completed as some 80% of the modules for a new design will come from the “standard” library leaving the designers free to concentrate on the area that needs further consideration to meet the customer’s specification.

### **A challenge of headroom**

Following the completion of the new pump modules, BP approached Amarith with a problem. It had an installation where 10 metre long pumps were needed but there was only 3-4 metres of headroom inside a building in which to raise them into for annual maintenance.

Using its new modular approach, Amarith was able to deliver 80% of the pump from its “standard library” whilst concentrating efforts on a design that allowed the shaft and columns to be split every two metres so that the pumps could be removed in sections.





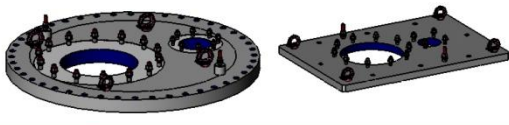
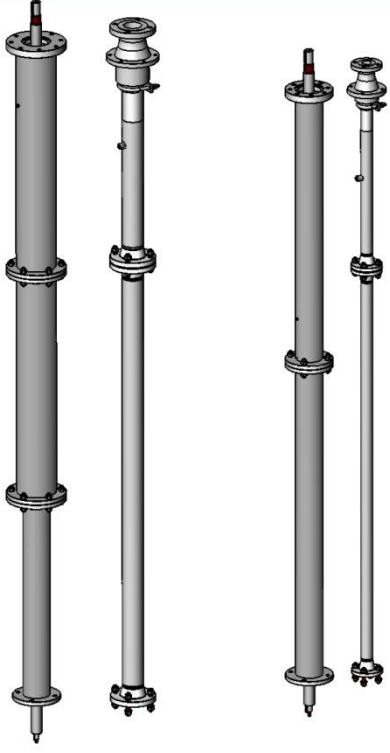
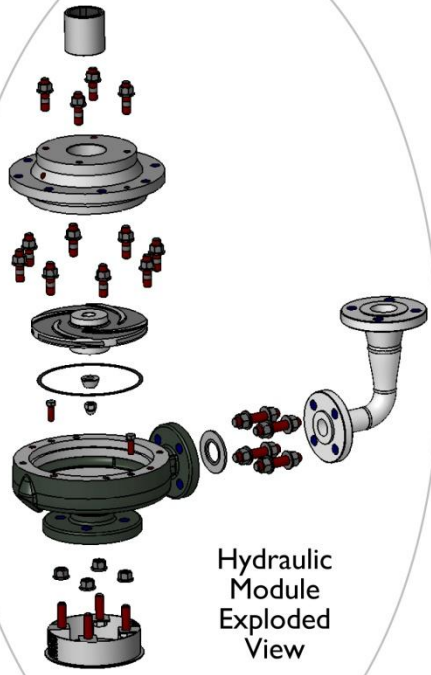

Rather than designing the product from scratch, which would have traditionally been the case, the engineers had to design just 20% of the components and so were able to quickly and easily achieve the customer’s requirements.

### **Engineering excellence is alive and well**

The challenges posed by operators such as BP has shown the engineering excellence that can be achieved even with a traditional product such as a vertical sump pump. Although there was a lot of up-front effort in designing the modules, the savings on new contracts in terms of time to market are dramatic. We have been able to deliver a vertical sump pump in as little as 14 weeks that traditionally would have taken 26 weeks. The next step in taking further bites out of the lead time will be to see how our suppliers lead time can be improved...

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### OPTIONAL PANEL or BOX ITEMS

Module 8 Drive		 <h2>Amarinth</h2> <p>Modular Vertical Sump              Pump Design Concepts</p> <p>Two Pump Configurations              Using Modular Concepts</p>
Module 7 Bearing		
Module 6 Lantern		
Module 5 Support		
Module 2 - Column Module 3 - Shaft Module 4 - Delivery		 <p>Hydraulic              Module              Exploded              View</p>
Module 1 Hydraulic		

## NOTES TO EDITORS:

Founded in 2002, Amarith has harnessed the skills, creativity and passion of people who have worked in the pump industry for many years. Amarith delivers world-leading expertise in the design, application and manufacture of centrifugal pumps and associated equipment to ISO, ANSI & API standards, primarily for the industrial, chemical & petrochemical markets. Their portfolio includes:

- **Pumps:** Horizontal and vertical API 610 pumps, chemical and industrial pumps, many of which are interchangeable with the Girdlestone pump ranges, eliminating the need for expensive modifications when replacements are required.
- **Pressure Vessels:** Protect System Plan 52 and 53A and 53B sealant systems with inbuilt condition monitoring for pumps and mixers that are suitable for Safe area up to Zone I.
- **Spares & Service:** High quality, fast lead-time re-engineered spare parts to improve performance and extend pump life, including many which are directly interchangeable with the Girdlestone pump ranges.
- **Packages & Modules:** Condensate Recovery Units manufactured for Spirax Sarco incorporating the innovative Ci-Nergy intelligent variable speed control system, plus bespoke packages & skids built to order.
- **Business Systems:** state-of-the-art e-commerce technologies that deliver 24/7 support enabling customers to select pumps and place orders on-line and then track every stage of manufacture through to delivery, any time, anywhere in the world.

The company operates globally from its base in Rendlesham Suffolk, United Kingdom and has a customer base of world-leading companies, including BP, Shell, ExxonMobil, GlaxoSmithKline, Pfizer, Spirax Sarco, Diageo, AMEC, Fluor and Halliburton.

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