

Since 1971 Flow has been shaping the technology of waterjet cutting:

Success thanks to research and innovation

The power of concentrated water has been utilized for cleaning purposes for more than a century and almost as long for cutting materials. For example, at the beginning of the 20th century, the waterjet was used to dig in gravel deposits and clay deposits. In the thirties, high-pressure waterjets were tested in Soviet and US-American mines for their use in coal mining and ore mining. In the sixties, with the introduction of composite materials for aircraft construction which could not sufficiently be cut or only with difficulties using conventional cutting-off processes, Boeing finally researched the use of the waterjet for the processing of these materials.

Bretten, September 5th, 2007 - However, the industrial application of waterjet cutting technology could still not be realized at the beginning of the seventies which is the reason why Boeing sourced out this developmental area: In 1971, Dr. Mike Pao founded Flow Systems Inc. in Kent, Washington, USA. But the first industrial application did not take place in the aircraft construction sector but in a completely different area. In the same year a high-pressure waterjet was used to cut baby diapers at Procter & Gamble.

Innovations and Patents

Since the beginning of high-pressure waterjet cutting, Flow Systems Inc. substantially influenced the development of this technology. Not least thanks to its innovative ideas, today's waterjet cutting technology is so versatile. In order to cut even hard materials such as metals, rock and glass using a waterjet, Dr. Mohamed Hashish developed at the end of the seventies the abrasive waterjet cutting technology that uses an injection system. For the first time, he was able to cut steel in a lab. The first patent for a cutting head for the abrasive waterjet cutting was already filed in 1981 (Picture 1). This was a forerunner of the cutting head PASER which is still in use today. Also, the pumps were forcefully developed further which made it possible in 1986 to introduce the first direct-driven ultra-high-pressure pump worldwide. In 1994, the company put a 3D abrasive cutting system on the European market for the first time. Two years later, the cutting head system PASER 3 was introduced. In conjunction with the drilling guide Ultra Pierce even brittle materials can now be drilled without mechanical pre-drilling. This

process is also patented. From 1996 on, the first PC control system FlowMaster made it considerably easier to operate abrasive waterjet cutting systems. Five years later, the revolutionary cutting technology Dynamic Waterjet was able to compensate taper errors of the part's edge without the intervention of the operator. Since then, this technology ensures both an improved part accuracy and an improved part geometry. The highly efficient cutting head PASER ECL Plus –available since 2002 - has increased the cutting speeds once more and can also boast a higher tool life.

The latest development by the waterjet experts is the HyperPressure technology that was presented at the EuroBLECH in 2006 for the first time in Europe; the technology can now achieve working pressures of 6,000 bar (Picture 2). The Service has been continuously improved. For example, in summer of 2006 the online ordering system for spare parts and consumables was launched to provide better customer support: www.FlowEuropeParts.com.

From the pump to the complete system

Flow started as a manufacturer of high-pressure pumps and the company still benefits from this know-how. The continuous increase of the working pressures from 2,000 bar at the beginning to over 4,100 bar in 1999 and to 6,000 bar for industrial applications in 2006 surely would not have been possible without the knowledge gathered over many years. However, it also became clear that the market demands complete solutions. From early on, the company positioned itself as a system provider offering waterjet cutting systems for various applications in the 2D area. This range of products has been consistently expanded over the years. Today, the company includes various waterjet cutting systems in its program covering everything from the beginner model to the high-end system for the 3D area and a wide range of accessories.

Worldwide presence

A global market leader for high-pressure waterjet cutting systems must be globally present. Already in October 1980, the European headquarter was founded as the „Flow Systems GmbH“ in Darmstadt. Later, the company was renamed to „Flow Europe GmbH“. In 1997, the company went another step ahead with the acquisition and integration of Foracon in Bretten/Germany - the specialist for system engineering in waterjet technology. In December 2001, the two locations were combined in Bretten (Picture 3). Today, Flow Europe GmbH has four subsidiaries in France, Spain, Italy and Great

Britain as well as agencies in the Netherlands, Belgium, Denmark, Ireland, Portugal, Poland, Russia, Hungary, Turkey, Israel, the United Arab Emirates, the Baltic countries, South Africa and India. Currently, Flow Europe has 69 employees, and employs a total of 850 people worldwide. In the previous business year the company had a turnover of 32.3 million Euros.

Still, further developments and innovations are the engine for the company's success. For this reason, approx. 6 to 9 percent of the turnover flows into research and development. It will ensure that in the future many more pumps and systems will be added to those 9000 already in use all over the world.

Picture 1 A glance into the past. Left: Cutting head from the beginnings of the abrasive waterjet cutting technology, right: the universal waterjet cutting system T11 (1991)

Picture 2 From then to now: the latest development by the waterjet experts is the HyperPressure technology; this technology achieved working pressures of 6,000 bar for the first time

Picture 3 Headquarter of Flow Europe GmbH in Bretten (near Karlsruhe), Germany

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With more than 30 years of experience and more than 9,000 installations Flow is the world market leader in the development, design, and sales of ultrahigh-pressure pumps and complete waterjet and abrasivejet cutting systems for processing a wide variety of materials.

Flow Europe is a subsidiary of Flow International Corporation, USA, and European Headquarters for all products relating to ultrahigh-pressure waterjet cutting technology. Flow Europe has subsidiaries in France, Italy, Spain, and the UK.

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