



VERSATILE **WATERJET** SOLUTIONS



The perfect solution for any application

Flow provides waterjet cutting systems that meet every need. As standard systems we offer two successful product lines:

IFB | Integrated Flying Bridge

With more than 2,000 units installed the IFB has become the most popular waterjet machine tool worldwide. Its design fills the industry's needs for a system that consumes minimal floorspace, provides excellent operator access and ease of use. All machine components have been incorporated in one compact machine. Loading and unloading is easy thanks to free access from three sides. The system is controlled via FlowMaster®, the Windows based control and programming system from Flow.

For maximum productivity, it is possible to equip the machine with optional features such as dual cutting heads or Dynamic Waterjet. Further options like the UltraPierce vacuum assist system, height sensor or laser pointer make the IFB a perfect machine tool for any application.



At high cutting speeds conventional waterjet systems create angular errors at the edge of the cut also known as taper. This undesirable side effect occurs due to reduced stream intensity during the cutting process.



Available sizes (work envelope):

Dynamic Waterjet technology:

7.2 x 2 m; 3.6 x 2 m; 2.4 x 1.2 m and 1.2 x 1.2 m*

Conventional technology:

7.2 x 2 m; 3.6 x 2 m; 2.5 x 1.25 m and 1.2 x 1.2 m*

* Size 1.2 x 1.2 m not available with HyperPressure technology

Z-axis travel: up to 200 mm, motorized axis

Machine dynamic motion ranges:

Rapid traverse speed maximum 12.5 m/min

Contour speed maximum 7.6 m/min

Machine positional specifications:

(per linear axis at 20 °C +/- 2 °C)

Linear positional accuracy: +/- 0.08 mm

Repeatability: +/- 0.05 mm

High-pressure pump:

HyPlex (3,800 bar)

Intensifier (4,150 bar)

Intensifier HyperJet (6,000 bar)

Ultrahigh-pressure pumps

The high-pressure pump is the heart of a waterjet cutting system. Productivity depends on its quality and performance. Since 1974 Flow has developed and manufactured its own pump systems. Since then Flow is the innovator in pump technology – and the only manufacturer worldwide offering direct drive and intensifier pumps. You choose the right pump for your application.



Intensifier pumps

Classic pump technology is based on the pressure intensifier principle. 210 bar of oil pressure is converted through a double-ended piston arrangement to up to 6,000 bar of water pressure. Flow's patented pressure intensifier and the extra large volume pressure attenuator offer incomparable stability and jet quality. These facts guarantee an outstanding cutting quality and increased cutting speeds.

Various pump sizes either as stand alone or as integrated design can be delivered. Motor power between 19 kW to 150 kW generates a water flow of 1.9 to 12.7 l/min at an operating pressure of 4,150 bar or 6,000 bar respectively.

HyperPressure Technology – the new dimension with 6.000 bar

With our innovative 6,000 bar HyperJet pump Flow sets the new standard for cutting speeds, abrasive consumption and productivity.

Cutting with 6,000 bar means

- 45 % more pressure compared to known technology
- up to 50 % higher cutting speeds
- up to 50 % lower abrasive consumption
- up to 30 % reduced production costs
- more competitiveness for Flow users



HyPlex pumps

The modern and efficient alternative to generating high pressures are the HyPlex pumps. The direct drive from three plungers achieves an unbeaten operational efficiency of more than 86 %. This is equivalent to approximately 30 % higher water flow rate for the same energy compared to the pressure intensifier pump. Continuous operating pressures of up to 3,800 bar are achieved.

Depending on the application, two different sizes of HyPlex pumps can be integrated into a cutting system: 22 kW or 37 kW with a water flow rate of 3.1 l/min or 4.7 l/min.

Dynamic Waterjet®: Technology combines precision with velocity

Flow scientists therefore developed a sophisticated technology to increase the accuracy – the system “Dynamic Waterjet”. Equipped with Active Tolerance Control this system moves the cutting head three dimensionally. The intelligent software FlowMaster, accurately predicts the correct tilt, the optimum cutting speed and the necessary rotary movement for every position along the cutting path. Dynamic Waterjet follows the contour smoothly and without a transition while the tilting angle is constantly being corrected according to the changing part geometry. Due to the tilt of the cutting head the cutting speed can be increased and part tolerances of +/- 0.04 mm can be achieved under optimal conditions even on thicker materials. Compared to conventional waterjet cutting systems Dynamic Waterjet achieves better part quality and higher cutting speeds. For the customer this means not only high cost savings but also a much better part quality.

WMC® | Waterjet Machining Center

The modular design of the WMC integrates all mechanical and electronic components as well as the high-pressure pump, to ensure optimum ease of operation and access.

The key to maximizing profits on a waterjet cutting system is to efficiently increase part production. Therefore the design of the WMC allows for unique configurations and customization to meet your individual needs. An advanced design, which separates the catcher tank from the X-Y frame ensures that the WMC is consistently capable of producing parts with high accuracy.

Rapid traverse and contouring speeds give the WMC exceptionally swift cycle times and allow it to machine even soft materials with pure waterjet.

The system is controlled by Flow's own easy to use FlowMaster PC control system, containing all the required parameters stored in a technology data base.



Available sizes (work envelope):

X-axis (bridge): 3 m or 4 m

Y-axis (base): 2 m, 3 m, 4 m or 6 m

Other sizes on request

Z-axis travel:

Dynamic Waterjet technology: up to 200 mm, motorized axis

Conventional technology: up to 250 mm, pneumatic-actuated axis

Machine dynamic motion ranges:

Rapid traverse speed maximum 35 m/min

Contour speed maximum 25 m/min

Machine positional specifications:

(per linear axis at 20 °C +/- 2 °C):

Linear accuracy rate: +/- 0.05/500 mm

Linear positional accuracy: +/- 0.08 mm

Repeatability: +/- 0.025 mm

Specified in accordance with ISO 230-2 and applicable NMTBA-specifications

High-pressure pump:

HyPlex (3,800 bar)

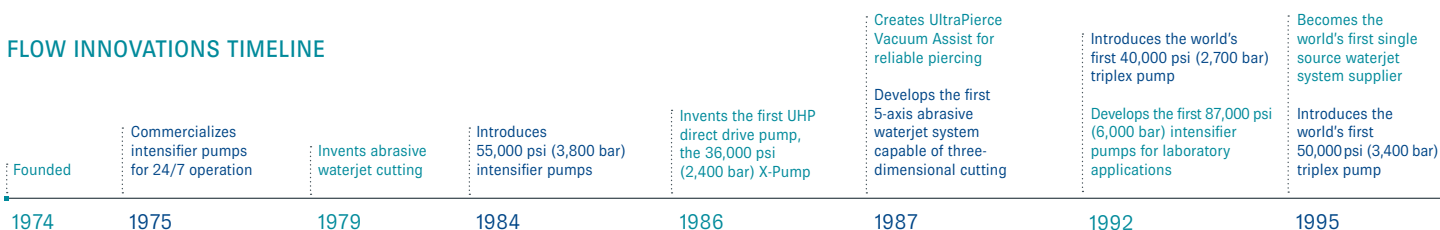
Intensifier (4,150 bar)

Intensifier HyperJet (6,000 bar)*

* only in combination with Dynamic Waterjet technology



FLOW INNOVATIONS TIMELINE



Custom systems for special applications

Custom cutting systems for any 2D or 3D application are offered by Flow in addition to the modular standard systems WMC and IFB. These are 5-axes systems for three dimensional abrasive waterjet cutting and robot cutting cells. Leading companies in the aerospace and automotive industry have put their trust in the extraordinary engineering know-how for special systems from Flow.



AF-Series - 5 axis for precise 3D waterjet cutting

The 3D waterjet cutting systems of the AF-Series are the ultimate tools for cutting 3D parts. The AF-Series is suitable for all manufacturers with three-dimensional cutting applications and job shops seeking to expand their capabilities. Highly productive, precise waterjet cutting of three-dimensional components becomes reality – with the AF-Series from Flow. For this reason a wide range of materials of various thicknesses can be cut with optimal material utilisation at the same time.

The drive system of the AF-Series works by means of digital AC servo motors which are controlled by a modern SINUMERIK CNC control system. The cutting table with an integrated waterjet catcher tank is free-standing so that heat transmission of the cutting table is prevented as well as the transfer of vibrations to the guiding system.

The orientation of the cutting head in the axle assembly is carried out by a C-B axes combination. The axes are arranged so that they cross in the focal point of the tool. The C-axis is parallel to the Z-axis. When re-orientating the cutting head, a compensating motion of the X/Y/Z assembly is therefore not required. This design guarantees even higher productivity. The programming is simplified and reduced; additional time consuming traverse paths are not necessary.



Available sizes (work envelope):

2.4 x 1.8 m and 2.4 x 3.6 m

Z-axis travel:

up to 600 mm

Machine dynamic motion ranges:

Rapid traverse speed maximum:
linear axes X, Y, Z up to 30.5 m/min
Contour speed maximum:
linear axes X, Y, Z up to 15.2 m/min

Machine positional specifications:

Positioning accuracy at the tool centre point TCP:
+/- 0.254 mm
Repeatability at the tool centre point TCP:
+/- 0.152 mm

High-pressure pump:

Intensifier 7XS-60 (4,150 bar, 50 HP)
Intensifier 20XWD-60 (4,150 bar, 100 HP)

Launches FlowMaster®
Windows®-based
intelligent waterjet
control software

Introduces the Bengal,
the first fully integrated
waterjet system

Introduces the PASER® 3
abrasive waterjet system

Commercializes
87,000 psi (6,000 bar)
pumps and systems
for food pasteurization

Introduces 60,000 psi
(4,100 bar) intensifier
pumps to the waterjet
cutting market

Introduces the IFB
which quickly becomes
the world's best selling
waterjet system

Introduces ESL ceramic
components to double
pump seal life and
increase reliability

Launches Dynamic
Waterjet® to
eliminate taper,
increase cut
accuracy and speed

Develops HyPlex
pumps, the world's
first 55,000 psi
(3,800 bar) triplex
pump family

Introduces state-
of-the-art WMC®,
a complete abrasive
waterjet system

Commercializes
highly precise
waterjet singulation
systems for the
electronics industry

First manufacturer
to introduce 87,000 psi
(6,000 bar) pumps
for waterjet cutting
applications

1996

1997

1998

2001

2002

2004

2006



INNOVATION | EXPERTISE | COMMITMENT

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