Best choice.
Waterjet cutting

Waterjet cutting is a machining process. A high-pressure pump can pump up to 3 liters of water per minute through a 0.28 millimeter water nozzle. This creates a fine jet with extremely high energy density, which is perfect for cutting all kinds of materials.

Versatile application across all industries

A waterjet cutting machine cuts every material that is softer than the cutting medium – even bullet resistant glass and ceramics. The procedure is also flexible with respect to material thickness: it can cut 0.01 millimeter-thin plastic films and 20-centimeter-thick titanium plates. Thanks to this versatility, users can make nearly anything, from the smallest precision parts for fine mechanics to 10 meter-long components for steel construction. Whether aeronautics, vehicle manufacturing, machine construction, food industry, glass machining, or medical engineering – water-cut parts are used in all these industries.
Cutting with pure water
With pure water cutting, the water is the separating tool. It is especially easy to cut soft materials with this procedure, including paper products, sealing materials, plastics, foams, textiles, and food. Pure water cutting is extremely precise: the water jet can be finer than 0.1 millimeter and it allows the cutting of fine contours, sharp angles, and tight radii.

Cutting with abrasive
A waterjet cutting machine also cuts hard materials, such as metal, stone, glass, or ceramics. For this, the water jet must be mixed with a cutting medium (abrasive) – for example, garnet sand. This procedure uses the abrasive jet as the separating device. The water jet serves to speed up the abrasive particles. Waterjet cutting with abrasive is comparable to microchipping.

Advantages of waterjet cutting
- Efficient production technology as well, and especially single part manufacturing
- Almost no heat input in the component through the cutting jet
- No structural changes in the material, such as increased hardness and micro fissures
- High machining accuracy and surface quality at the cutting edge
- No pollutants created during the cutting process

20 millimeter mild steel, cut with abrasive waterjet (left); cut with laserjet (right).
Requirements and solutions

Power range of all ByJet models in the respective basic version

Fast and efficient perfect parts
- Extensive, customizable material database
- Cutting parameters can be tailored directly on the machine at any time
- Efficient automatic nozzle calibration setting
- Automated cutting with freely selectable penetration type (low-pressure penetration or pre-drilling)

Secure manufacturing with automated process management
- Continuous control of the distance between the nozzle and the workpiece. During multiple head operation, each tool has its own height sensor
- Faster machine stop in the event of collision with upright parts
- Clog detection at the cutting head
- Unmanned production, even with complexly nested, multiple-head cutting plan

Absolute control of production costs
- Exact dosage of optimal abrasive amount
- Regulated pump pressure after CNC specification

Expanded power range via options (pages 14–17)

Increase efficiency
- Two-head operation with automatic vehicle distance displacement
- Large working area for high parts production
- Cutting with up to 5300 bar
- 3D cutting technology for diagonal cutting edges up to 45°

Reduce costs
- Possibility of retroactive expansion, as needed
- Angle correction with 3D cutting head
- Reduced non-productive time via separate cutting zones
Simplify processes

- Drill spindle for starting hole in brittle materials
- FixMaster allows cutting activities without micro joints
- PositionPointer for easy cutting head positioning
- High-pressure pump with direct drive for planable service intervals

Not all products listed in this brochure are available in all countries.
ByJet Flex

Maximum flexibility

Customer benefits

- Can retrofit up to two 3D cutting heads, each with a continuous height sensor
- Everything on one platform: In addition to 2D cutting heads with extra options (drill spindle and FixMaster), 3D cutting heads may also be used
- Modular basin concept enables later expansion of the work surface to a length of up to 10 meters
- High parts production through reliable high-pressure technology
- A reduction in non-productive time with separate cutting zones from a six by three meter work surface
**ByJet Flex 1530 to 10030***

<table>
<thead>
<tr>
<th>Feature</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cutting heads</td>
<td>1 or 2</td>
</tr>
<tr>
<td>Maximum positioning speed parallel to the x, y axis/simultaneously</td>
<td>60 m/min/84 m/min</td>
</tr>
<tr>
<td>Positioning accuracy Pa**</td>
<td>± 0.05 mm/m</td>
</tr>
<tr>
<td>Repeatability Ps**</td>
<td>± 0.025 mm</td>
</tr>
<tr>
<td>Maximum cutting range for flat processing</td>
<td>3068 × 1544 mm to 10 084 × 3068 mm</td>
</tr>
<tr>
<td>Maximum workpiece weight on cutting grid (standard grid slats)***</td>
<td>1900 kg/m²</td>
</tr>
<tr>
<td>Max. component height on standard grate slats</td>
<td>250 mm</td>
</tr>
</tbody>
</table>

* ByJet Flex 1530, 2030, 4030, 6030, 8030, 10030

** Machine precision according to VDI/DGQ 3441. The cutting precision depends on the type of material and its pre-treatment, the material thickness, the sheet size and its warming.

***Static load of new grate slats

@ webcode 030107
ByJet Smart

The clever, compact solution

Customer benefits

■ Up to two fully automatic CNC-controlled and monitored cutting heads ensure a short throughput time
■ Low purchase price thanks to focus on the essential
■ High efficiency of the pump and long service intervals keep operating costs low
■ High-end assemblies and materials for long-lasting high precision
■ Minimal set-up space due to integrated components as well as good accessibility from several sides
### ByJet Smart 3015

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of cutting heads</strong></td>
<td>1 or 2</td>
</tr>
<tr>
<td><strong>Maximum positioning speed parallel to the x, y axis/simultaneously</strong></td>
<td>20 m/min/28 m/min</td>
</tr>
<tr>
<td><strong>Positioning accuracy Pa</strong>*</td>
<td>± 0.05 mm/m</td>
</tr>
<tr>
<td><strong>Repeatability Ps</strong>*</td>
<td>± 0.025 mm</td>
</tr>
<tr>
<td><strong>Maximum cutting range for flat processing</strong></td>
<td>3068 × 1544 mm</td>
</tr>
<tr>
<td><strong>Maximum workpiece weight on cutting grid (standard grid slats)</strong></td>
<td>1600 kg/m²</td>
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<tr>
<td><strong>Max. component height on standard grate slats</strong></td>
<td>200 mm</td>
</tr>
</tbody>
</table>

* Machine precision according to VDI/DGQ 3441. The cutting precision depends on the type of material and its pre-treatment, the material thickness, the sheet size and its warming.

** Static load of new grate slats

@ webcode 030106
Bystronic high-pressure pumps

All pump systems offer seamless integration into the cutting processes. Thus, direct pump control enables precise pressurization. This creates clearly reduced pressure peaks and longer downtimes for high-pressure components.

ByPump Ultra / ByPump Ultra+
- For highest cutting quality, even in thick materials
- Reduced abrasive use due to high cutting speed
- Smallest nozzle diameter possible with minimal capacity
- ByPump Ultra+ for maximum capacity in two-head operation

ByPump Direct / ByPump Direct+
- High energy efficiency with direct operation
- Long service intervals and preventative maintenance concept
- Minimal noise level
- Reduced space requirement with compact design
Optimal operating conditions
Dependency of maximum nozzle size and water pressure in single-head operation

Possible configurations

<table>
<thead>
<tr>
<th>Machine</th>
<th>Cutting carriage with tool</th>
<th>High-pressure pumps</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ByJet Smart 3015</td>
<td>×</td>
<td></td>
</tr>
<tr>
<td>ByJet Flex 1530–10030</td>
<td>×</td>
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<td></td>
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</tbody>
</table>

- Basic version
- Option

Technical specifications

<table>
<thead>
<tr>
<th></th>
<th>ByPump Direct</th>
<th>ByPump Direct⁺</th>
<th>ByPump Ultra</th>
<th>ByPump Ultra⁺</th>
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</thead>
<tbody>
<tr>
<td>Max. working pressure</td>
<td>3600 bar</td>
<td>3600 bar</td>
<td>5300 bar</td>
<td>5300 bar</td>
</tr>
<tr>
<td>Max. feed capacity at max. pressure</td>
<td>2.5 liters/min</td>
<td>5.0 liters/min</td>
<td>3.2 liters/min</td>
<td>6.7 liters/min</td>
</tr>
<tr>
<td>Max. ↗ water nozzle at max. pressure (1-head/2-head)</td>
<td>0.28/0.20</td>
<td>0.40/0.28</td>
<td>0.28/0.20</td>
<td>0.40/0.28</td>
</tr>
</tbody>
</table>
Most important options

Drill spindle preparation/ FixMaster
Lift axle with quick release for fast drill spindle or FixMaster changes.

Drill spindle (module)
For material-friendly start hole creation, e.g. in composite materials.

FixMaster (module)
Patented parts fixing in the stamping skeleton, which allows cutting work without micro joints.

PositionPointer
Easy cutting head positioning over the material: Edge detection, displacement of the null point, and continuation on the contouring.

Separate cutting zones
The virtual shuttle table system enables cutting on the machine as well as simultaneous secure loading and unloading. If necessary, the entire cutting range can be used for oversized sheet metal.

PrecisionAligner
Mechanical fine-tuning of the cutting heads enables precise cutting with more cutting heads in a single part.
Parts collecting grid
Collects parts that fall into the cutting basin during the cutting process.

Automatic sludge removal
The abrasive water mixture is swirled via rinsing modules and then suctioned out of the cutting basin.

Water level adjustment
Raises and lowers the water level in the cutting basin. Thus allowing parts to be cut quietly under the water.

Precision stops
Robust impact at the basin edge for repeatedly accurate sheet alignment on the machine.

Clamping bar in front basin element
Additional clamping bar parallel to the grate slat starting with machine size 4030.
Most important options

3D cutting heads
Precision cutting head for large and small cutting angles. Kinematics pivot directly around the cutting jet’s focal point. Constant focus position ensures integrated height sensor.

Cutting tool for pure water
Allows the change between cutting with abrasive and pure-water jet on the cutting head.

Brush sensor
The brush sensor enables continuous reading of easily scratched materials.

Status light
Indicates machine status with color code. Magnet base enables flexible positioning.

Observer
Web-based remote monitoring to location-dependent machine status inquiries.
<table>
<thead>
<tr>
<th>Option</th>
<th>Customer benefits</th>
<th>Waterjet cutting system</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Increase efficiency</td>
<td>ByJet Smart 3015</td>
</tr>
<tr>
<td>Drill spindle preparation/FixMaster</td>
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<td>✓</td>
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<tr>
<td>Drill spindle (module)*</td>
<td>x</td>
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<tr>
<td>FixMaster (module)*</td>
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</tr>
<tr>
<td>PositionPointer</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>Separate cutting zones</td>
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<td>–</td>
</tr>
<tr>
<td>PrecisionAligner</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>Parts collection grid</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic sludge removal</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>Water level adjustment</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>Precision stops</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>Clamping bar in front basin element</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>3D cutting head preparation</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>3D cutting head</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>3D cutting tool for pure water</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>2D cutting tool for pure water</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>Brush sensor</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>Status light</td>
<td>x</td>
<td>–</td>
</tr>
<tr>
<td>Observer</td>
<td>x</td>
<td>–</td>
</tr>
</tbody>
</table>

- not available
- Option
- Includes preparation with ByJet Smart
Modern sheet metal processing without high-performance software is unimaginable these days. BySoft 7 offers a comprehensive range of functions and is still easy to operate. With BySoft 7, the user can quickly and easily design tailored parts and create cutting plans and bending programs with the push of a button. Furthermore, manufacturing processes are scheduled and monitored efficiently, thus maintaining an overview and finishing jobs quickly and economically.

BySoft 7

Modular CAD/CAM software with 2D and 3D CAD as well as extensive functions for scheduling and monitoring manufacturing processes

Customer benefits

■ Existing drawings and models can be input, edited, and processed easily
■ Reduction in parts costs, because BySoft 7 automatically nests parts perfectly. Raw materials are used in their entirety
■ Automatic multiple-head cutting plan creation, even when incorporating drill axis (n) and FixMaster
■ Secure cutting paths without nozzle collision, because the cutting head rarely runs over previously cut parts
■ Diagonal and straight cutting edges programmable with the Bevel Manager
■ Offers comprehensive options for scheduling and monitoring manufacturing processes
■ Provides maximum transparency because all machine and job data are always available
■ Efficient connection to ERP/PPS systems
ByVision is the high-performance controller developed by Bystronic for laser and waterjet cutting systems and pressbrakes. It stands for the highest productivity and is optimally tailored to Bystronic machine systems. ByVision ensures, as no other controller can, that the features of the machine system are used optimally.

ByVision

Simple, user-friendly, and fast control of laser and waterjet cutting systems as well as pressbrakes

Customer benefits
- Flexible high-performance controller for more productivity and profitability
- Intuitive operation via touchscreen
- Fast transfer rates
- Tools for troubleshooting
- Can be switched to many languages
Bystronic Collections

Not all products listed in this brochure are available in all countries.

This brochure may show parts that are not standard equipment, but are available as options. For the better visibility of machine details, some safety covers may have been opened or removed for these pictures. The right to make changes to dimensions, construction, and equipment is reserved. For technical data, see the separate data sheets.

ISO-9001-certified
Best choice.