

# **MicroStep<sup>®</sup>** **NEWS**

*spol. s r.o.*

**MSF**

Cutting pipes with fiber

**ABC**

Adaptive bevel compensation

**DRM**

Strongman in each job

**MG**

Complex cutting all-rounder







## Dealers

**M**icroStep, spol. s r.o. as a manufacturer based in Slovakia maintains a policy of selling to foreign countries exclusively via dealers or local subsidiaries. It has several advantages – a local company has knowledge of the local market which implies good understanding of customer's situation, it is closer to its customers in distance which ensures good reaction times, it can serve its customers in local language – to name a few.

Contact the MicroStep dealer in your area to discover the variety of MicroStep products and features!



## Setting standards for the future / Introduction



Ing. Alexander Varga, PhD.  
General manager

In 1991, together with my colleagues we created a company in order to follow our professional ideas and dreams. We set off to something that was later to become a successful and fulfilling journey. A journey of what we believe – and we make very practical efforts to transform this belief into reality – is by no means nearing its end. Throughout the years we have been carefully observing industry's latest trends and, being a company at the technological top edge, we inspected each and every news from the perspective of best possible utilisation for a large group of end users. In addition to fast integration of relevant supplier innovations, we continuously implemented outputs of our own research into our products with the aim of overall technological improvement of the production process. The ability to adapt to latest trends and provide flexible solutions in a relatively short time and fair pricing soon turned out to discover a market niche aimed at

the segment of forward-thinking and technologically literate customers. Our research background from the fields of automation and regulation allowed us on many occasions, instinctively, to seek different approaches from those of traditional machinery enterprises who dominated the cutting market for decades. We introduced new design concepts of plasma cutting machines with their outstanding dynamic properties and rapid positioning speeds, were one of the first companies to use a CNC control system based on Microsoft Windows®, introduced CNC machines that integrated different technologies in a single machine in an extent never seen before, developed different kinds of bevel tool stations for cutting 3D objects such as domes, HSS and IPE profiles or elbows. Step by step, our approach won recognition of the industry and opened our doors also to premium customers with global coverage – some of these valuable customers you will find as references on the pages of this magazine. In our 23 years of history, MicroStep supplied more than 1,900 machines worldwide with strong channel partners spread in 52 countries. More than 30% of company's products are complex ma-

chines that require continuous development and search for new, innovative technical solutions. Our goal is to provide solutions that improve everyday job in the factories – they assure higher precision, minimize downtimes, assure more convenient and more effective operation and easier maintenance. We achieve this through higher automation levels, interconnection of control systems, CAM software and ERP systems at customer's site (our production management software MPM has already found its application in several enterprises in Europe and Asia – either integrated into customer's ERP system or standalone), and through development of more sophisticated equipment. And our customers obviously agree: e.g. our patent pending technology ACTG – a system that reduces the setup time of bevel head from hours to a couple of minutes – has already been delivered with more than a hundred systems and is proving its high relevancy in daily operations worldwide.

Today, MicroStep offers the full range of contemporary cutting technologies along with a great variety of additional equipment and software such as drilling, tapping & countersinking, marking, process synchronization and ma-

terial handling. In addition to our own R&D base we work closely with departments of the Slovak Technical University in Bratislava and the Institute of Materials & Machine Mechanics of the Slovak Academy of Sciences on utilization of latest achievements in design and control of machinery. Thanks to our constant search for innovations we have quickly become a valued partner for many renowned suppliers who share with us their latest developments from the very start. To put it briefly, our business is a never-ending story of continuous modernization of the entire product portfolio.







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## Complex cutting all-rounder

*MicroStep's flagship MG redesigned and more powerful than ever*

The machine has it all: a high-end design with a long tradition in the field counting hundreds of successful installations, outstanding dynamics and precision, a great variety of equipment to choose from with dozens of functions. For the moment it is the most popular MicroStep machine and it gets all the attention it deserves as it represents crème de la crème of the MicroStep cutting philosophy. The abrupt development of cutting technologies, especially on the plasma side, which has occurred in recent years, has also brought new challenges for design of cutting machines. The ever growing cutting capacities with more powerful plasma sources and heavier torches on one side were accompanied with new technologies for finer edge finish of holes and small contours and increased cutting speeds that put greater demands on mechanics and motion and process control. At the same time, modernisation of several types of MicroStep's tool stations (bevelling tool station, oxy triple torch tool station, drilling tool station) resulted in a new generation of equipment with improved func-



tionality, but also heavier execution. In order to address the new requirements and provide necessary dynamic properties the whole MG machine got a new, reinforced design: the sideway consoles were extended to support the more robust and stiffer gantry, the machine frame and guideline system were reinforced for the sake of stability during rapid positioning. The drive system has also been modified with stiffer gears and stronger motors. All in all the changes gave our machine a more robust, how-

ever not less dynamic look. When observing the two generations of MGs side by side, the design change is obvious. Yet it is the capabilities that count: a combination of high-precision cutting up to 250 mm, marking, drilling up to Ø 40 mm, tapping up to M33 and countersinking in various types of materials (including sheets, pipes and domes) with great dimension range using only one single machine is a concept that makes MG a top performer ahead of its class.







## Versatility in structural jobs

### 3D cutting solutions for steel constructions

Part from standard flat-bed machines, MicroStep offers an exceptional variety of equipment for processing of 3D rotary objects and structural steel sections of various shapes. The rotary objects include differently sized circular, square and rectangular hollow sections (diameters of circular sections reach from Ø 30 mm up to Ø 3,000 mm), conical pipes, torispherical or elliptical domes and elbows. Standard configuration of a MicroStep machine in sheet and pipe cutting execution consists of a cutting table for placing the sheets and an extracted channel for pipe positioning that is placed along the longi-

tudinal side of table. The pipes are clamped in a rotary pipe cutting device located at one end of the channel. The cutting process involves a combination of movements: a gantry, a tool station – alternatively a bevel tool station – and the pipe cutting device are synchronized for a precise positioning of the pipe towards the cutting tool. In addition, special adapters for clamping of polygonal profiles or elbows can be attached to the pipe cutting device. For cutting of domes, a dome cutting area can be located behind or in front of the cutting table. A single cutting tool is used to process all different shapes of material. In addition, for applications in the

structural steel industry MicroStep developed a product line of specialized machines for cutting of structural steel sections as well as single-purpose machines for automated cutting and drilling of flanged parts. These machines can be supplied in various executions depending on types and sizes of the processed material or the requirements for automation of material input and/or part output, and eventually connected to a production line in the customer's facility. For cutting of hollow structures of circular and rectangular cross-sections we supply cutting machines PipeCut and CPCut. Both systems are of a modular execution that



#### References

enables configuration of their deliveries according to particular requirements of customer's production. PipeCut machines can have a working length of 3 m, 6 m or 12 m and process pipes with diameters ranging from Ø 50 mm to Ø 800 mm. The maximum wall thickness is 50 mm for plasma cutting (depending on the capacity of the plasma source), and up to 100 mm for oxyfuel. On the other hand, CPCut machines can also process large-sized pipes with diameters of up to Ø 3,000 mm.

Depending on the range of cut diameters and wall thicknesses, these machines are equipped with various supporting systems ensuring support of the cut profile during the cutting process. These can be easily adjusted for required profile dimensions in a certain limited extent or exchanged for a different range of dimensions. A cutting machine can be equipped with a bevelling tool station with a torch tilt range of  $\pm 50^\circ$  that enables cutting with automatic weld

#### Your partner for Cutting and Automation



preparation, even for complex intersection of pipes, or pipes and rectangular profiles. For cutting of open sections, such as I, H, U or L profiles, MicroStep has recently launched a new product – ProfileCut. Its specialized 3D rotator with a tilt of  $\pm 120^\circ$  enables cutting of structural sections without the need for their rotation in the cutting process. In addition to

cutting of open profiles, ProfileCut machines can be equipped with more cutting zones, e. g. for processing of hollow profiles (cutting in the same way as on a PipeCut machine) or for sheet cutting like on a standard flat-bed machine. The functionality of ProfileCut can be enhanced by adding a drilling head for drilling up to Ø 40 mm hole diameter, with automatic tool



exchange and internal cooling of drill bits, or by various marking devices.

When cutting structural steel sections, the material is loaded manually into the cutting zone; the cut profile is motionless during the cutting process and the cutting head moves around it both in the longitudinal and transverse directions. For requirements of automation of the cutting process with automatic loading and unloading of the material, a modified version of machines is supplied in which the material is loaded into the working area using a special positioning system.



ProfileCut 25501.30 PpksB + P  
[www.lmv.it](http://www.lmv.it)

#### LMV S.p.A. / Italy

Since 1974, the company LMV provides the complete services in the fields of carpentry and metal construction, including construction of industrial buildings, structures for single-storey and multi-storey buildings, composite beams, bridges, walkways, stairs, porches and out-buildings for both residential and industrial purposes. The company also specializes in supply and processing of angles, metal sheets, plates, beams and all types of customized carpentry, produced with the use of the most modern facilities for cutting, welding and processing of even large thicknesses. With more than 150 employees, LMV's production capacity of more than 30,000 t/year.





# Comprehensive bevelling at a glance

The area of bevel cutting has been one of priorities and an integral part of MicroStep's R&D for many years. We soon enough acknowledged the importance of this technology for streamlining of the production process and realized that many fields of the engineering industry would greatly benefit from its proper development. The subsequent development in this area – especially in recent years – have only confirmed our assumptions. Anyway, thanks to our long-term focus and experience in this field we were able to continuously innovate the equipment and, furthermore, develop new technologies that secured us today's stable place among market leaders in bevel cutting. According to field studies, up to 50 % of parts produced in the CNC cutting industry worldwide need to have bevelled edges, yet only a considerably smaller percentage of machines is equipped with bevel tool stations. The

reason may be the additional cost of this advanced equipment, but mainly it is a relatively low awareness of decision makers in engineering companies about the possibilities, availability and reliability of contemporary bevelling tool stations. The benefits – greater precision along with significant savings of production time and capacities – easily outweigh the higher initial investment. Moreover, in automated preparation of bevelled edges on 3D objects such as domes, pipes, rectangular or IPE profiles, the use of specialized tool stations on gantry-based machines brings a great financial benefit compared to the commonly used robots. Since the introduction of our plasma rotator in 2000 and a waterjet rotator in 2001, MicroStep has made continuous efforts to establish automated CNC bevel cutting as a common and highly efficient production technology for preparation of weld edges on different

types of materials. Our goal is to deliver cutting machines that can produce cut parts with bevels in convincing quality and precision, yet the operation of the machines is kept reasonably simple. Throughout the years, improvements of mechanics and motion control of our rotary- and 3D tilting tool stations went hand in hand with the third-party development of energy-beam sources and our implementation of the latest cutting technologies developed by our suppliers. Thanks to this background, we are today able to offer a comprehensive bevel cutting solution for a wide range of materials and thicknesses. Furthermore, thanks to unique features of our in-house developed control system iMSNC and a profound knowledge of different cutting technologies, MicroStep machines are capable of combining various technologies (e.g. plasma and waterjet) within a single cutting plan 1 2.



## References

Our comprehensive bevelling function and supporting functions such as torch geometry calibration and adaptive bevel compensation allow our customers to cut bevels in a convenient way using different cutting technologies and their combinations – plasma, oxyfuel and waterjet 3 – as well as to create bevels in a wide material thickness range reaching from 5 mm to 300 mm (depending on the used cutting technology). MicroStep machines can provide two types of bevel cutting processes:

**DBP – Direct bevelling process** – represents the classic way of bevel cutting where the bevel is cut directly into the raw material (sheet 4, pipe 5, profile or dome). The cut edge of required shape – A, V, Y, X or K – is created via multiple consequent transitions of the cutting tool (at different angles) along the cut edge. MicroStep machines with two rotators allow cutting of two identical parts using two rotary heads at once 6.

**ABP – Additional bevelling process** – enables adding bevels to parts that have already been cut with a straight tool. After such a vertically "pre-cut" part is placed on a random spot on the cutting table, a laser-line scanner 7 is used to determine the part's exact position. Afterwards, the additional bevel is cut 8 9.

ABP as a supplementary feature to DPB provides several add-ons:

- it can add bevels to parts which were cut on an external machine (e.g. parts supplied by a customer to a job shop)
- it can produce parts with bevels of greater thickness than allowed by the capacity of the applied energy-beam source for DBP (e.g. it can cut top-Y bevel by plasma on mild steel parts with thickness > 50 mm, or add bevels to parts with thickness of up to 300 mm using an oxyfuel rotator)



- when applied instead of DBP, ABP can greatly minimize waste of material and save consumables

Generally, the accuracy of bevel cutting is determined by mechanical accuracy of the cutting machine, accuracy of the cutting technology and the stage of development of applied algorithms of control of the torch distance from the cut material. Apart from consistent use of high-quality components, the mechanical accuracy of MicroStep bevel cutting machines is provided by several advanced solutions:

**ITH – Intelligent torch holder** – ensures protection of the torch in case of an accidental collision. Its slip-back function ensures return of the torch into the correct position after elimination of the collision. The ITH body includes an advanced sensor system for detection of the exact torch position and provides also the endless rotation function.

**ACTG – Auto-calibration of tool geometry** 10 – secures that during rotation and tilting of a rotator the torch tip always stays in the required (exact) position. The ACTG system consists of a calibration station 11, a torch extension probe and advanced control software. ACTG eliminates the necessity of mechanical adjustment of the bevel head and significantly reduces setup time of the machine from several hours to a couple of minutes.

**Compensation of longitudinal displacements** – an optional function which ensures absolute accuracy of



the cutting machine in the longitudinal direction. During installation, the machine is measured by a laser interferometer and the measured values are used for calibration of the positioning system. The measurement can be applied upon request in case of cutting of long parts with very high demand on accuracy.

Accuracy of the cutting technology is enhanced by eliminating beam deviations that occur naturally when the torch is in a tilted position in relation to the material and cause an unwanted difference of the cut angle from the theoretically programmed slope 12.

**ABC – Adaptive bevel compensation** – is an advanced feature of iMSNC for compensation of such beam deviations. ABC enables implementation of databases of compensation angles and other values for various cutting technologies (e.g. Hypertherm's True Bevel™ technology). The compensation values can also be adjusted directly by the machine operator 13.

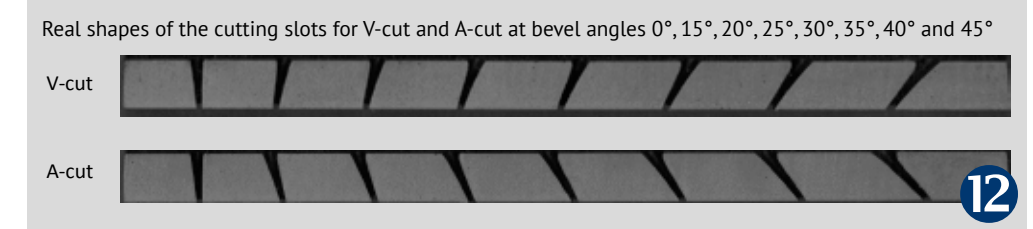
And finally, to ensure precise following of the material surface during plasma bevel cutting with the torch positioned always in the correct cutting height, MicroStep developed a smart height control system:

**STHC – Self-teaching height control** – a combination of 3D motion control, self-teaching algorithms and adaptive height control according to the plasma arc voltage. STHC ensures positioning of torch in the correct height at any angle (e.g. during cutting of variable bevels).

All the described functions greatly contribute to improvement of accuracy



of the bevel cutting process. Our more than 400 bevelling tool stations supplied in the field and first of all the excellent bevel cutting results achieved on MicroStep machines tell the story by themselves.



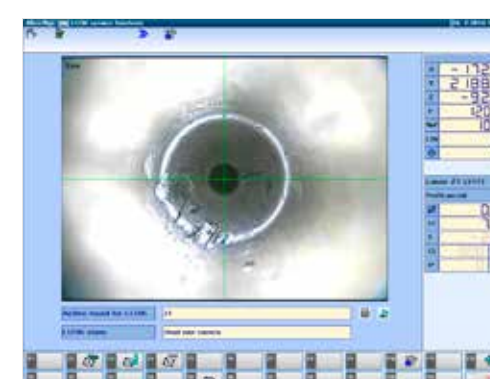
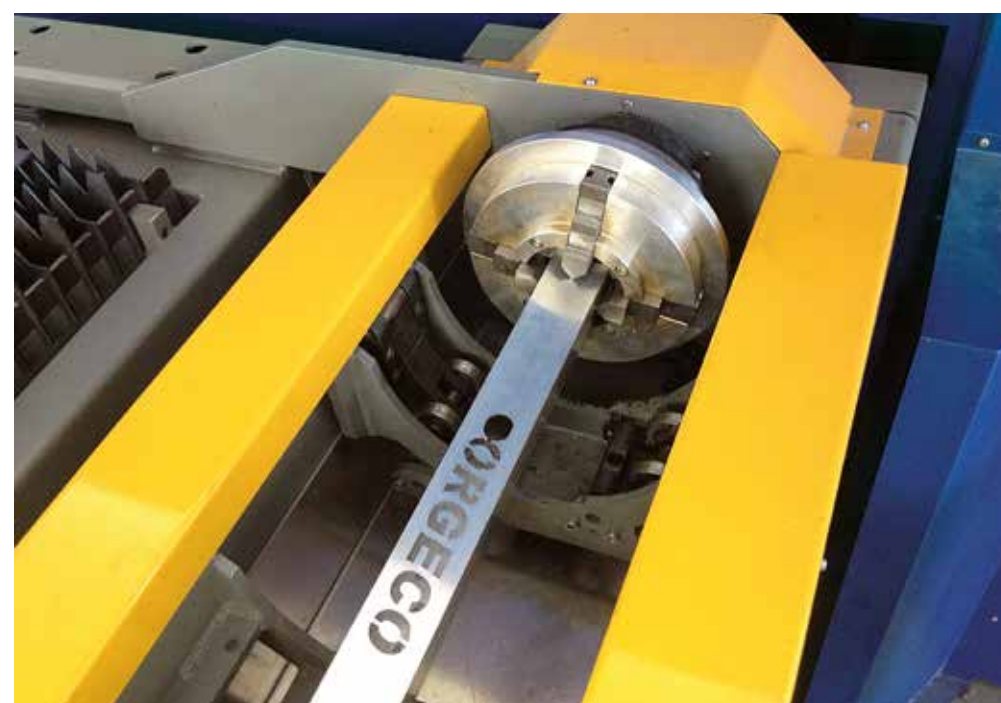




## MSF: Fiber laser machines to suit your needs

Gradual replacement of CO<sub>2</sub> lasers with solid-state fiber lasers has been going on in the field of laser cutting for some time now. When compared to the still dominant CO<sub>2</sub> lasers, solid-state fiber lasers bring a number of advantages. Obviously, the main benefit of fiber lasers is savings of up to half of expenses for operation and maintenance of the cutting machine; this advantage dominantly determines the rate of growth and popularity of this technology. Not only that no laser gases are necessary for its operation, also the source itself is greatly effective: nominal power of a 4 kW fiber laser (including a cooler) is about 18 kW, compared to 57 kW for a 4 kW CO<sub>2</sub> laser. There are also no maintenance costs associated with the lifetimes of discharge tubes or the turbine in the cooling circuit of laser gases, or the vacuum pump, while these expenses create a significant part of maintenance costs of a CO<sub>2</sub> laser. Unlike the situation just a few years ago, contemporary fiber lasers (4 kW) can cut mild steel up to a thickness of 20 mm, stainless steel to a thickness of 15 mm, aluminium to 15 mm, brass to 8 mm and copper to 6 mm in excellent quality.

Since the product launch in 2010, MicroStep's fiber laser cutting line MSF has undergone a vivid development. Not only the outer looks have changed significantly but more importantly the performance, the cutting range and features have grown to higher precision and speeds, easier maintenance and a wider offer of additional equipment. We are currently supplying machines with working areas of 3 x 1.5 m, 4 x 2 m, 6 x 2 m, and 12 x 2.5 or 12 x 3 m, all of which are equipped with an automatic shuttle table and a conveyor for discharging waste from the cutting area of the machine. The machines are equipped with laser sources from the market leader IPG with powers reaching 1 – 5 kW. Optionally, each machine can be supplied with a pipe- and profile cutting zone for materials with outer diameters of up to 500 mm. Depending on the requirement, we supply three different designs of pipe cutting zones with respect to the workload (min/max pipe dimensions, manual or automatic loading of pipes and discharging of cut parts). For easier operation and maintenance (besides integration of latest designs of cutting heads with automatic focus posi-



### References

tion and focus diameter adjustment), additional default functions were adopted to increase the machine's performance: automatic plate edge detection and plate measuring via capacitive sensor in the cutting head, automatic nozzle calibration and nozzle cleaning. For optical checking of the state of the laser nozzle, a real-time camera is a part of the nozzle calibration station.

Utilizing physical properties for the benefit: thanks to a 10x shorter beam wavelength, fiber lasers can achieve a smaller beam diameter (i.e. higher energy density) in the focus of the cutting head and thus cut thin materials faster than a CO<sub>2</sub>. However, the thicker the cut material, the more this fact turns into a disadvantage because of a very thin kerf and the resulting risk of kerf flooding with material when increasing material thickness. It is therefore necessary to have a larger focus diameter for cutting thicker materials, and for the sake of industrial use, the la-

### Your partner for Cutting and Automation

ser cutting head should be able to change the focus diameter automatically (without the intervention of operating staff, e.g. manual lens change). To fulfil the versatile demands of the job shop

of the focus position and the focus diameter in a fully automatic process. This allows convenient cutting of materials up to 20 mm thickness while using a single diameter fiber. The cutting heads

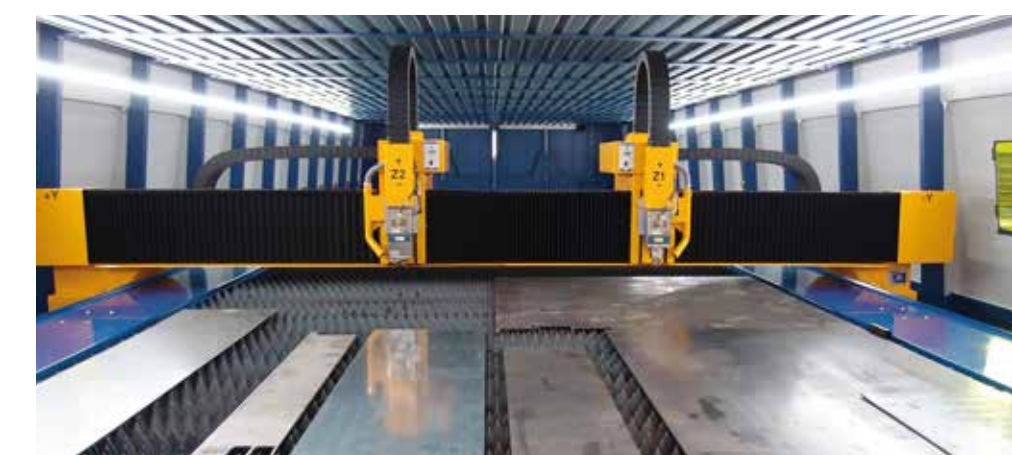


market, i.e. cutting across the whole thickness range, MicroStep is using HighYAG's benchmark laser cutting head BIMO-FSC that enables independent adjustment

are free from lens change – the only task of the operator is to clean the cover slide. To ensure excellent gas management in the cutting heads,

MSF machines use dedicated gas consoles from the company Hoerbiger equipped with fast piezoelectric valves that enable extremely fast switching of gases during the cutting process and a

very precise proportional valve for gas pressure control.



**CACCIN**  
LAVORAZIONE METALLI

MSF 12001.25 LL  
[www.caccin.net](http://www.caccin.net)

### CACCIN Lavorazione Metalli s.r.l. / Italy

The ISO 9001:2008 certified company has been operating for 17 years as a service centre for processing of sheet metal – the competences include sub-supply of products from mild steel, stainless steel or electro-galvanized steel, produced by means of laser cutting, plasma cutting, punching and bending. CACCIN's modern 5000 m<sup>2</sup> production area holds equipment able to process sheet metals with sizes up to 12 m x 3 m and thicknesses up to 30 mm.



# Accessories of MicroStep machines



## Plasma / Tilting



Plasma tool station incl. anti-collision protection, laser pointer, arc-voltage THC and full support of plasma marking. Tilting tool station enables automatic setting of torch slope  $\pm 90^\circ$  for bevel cutting in longitudinal direction.



## Rotator / 3D tilting



5-axis plasma head with endless rotation enables bevel cutting of sheets, pipes and profiles up to  $50^\circ$ . The innovative ITH torch holder includes sensors for torch displacement detection, IHS and auto-calibration.



## Rotator 90° / 3D rotator 120°



6-axis bevel head with tilt range up to  $90^\circ$  enables bevel cutting and trimming of domes and pipes including accurate weld edge preparation for manual or robot welding. In addition, 3D rotator  $120^\circ$  with tilt range up to  $120^\circ$  enables cutting of open profiles I, H, U or L.



## ACTG



ACTG station provides auto-calibration of tool geometry for automatic compensation of mechanical inaccuracy of the cutting tool as well as calibration of ABP scanner and automatic measurement of drilling tools.



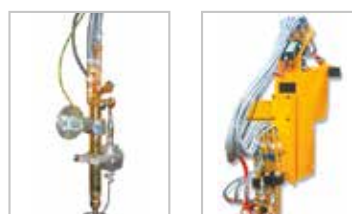
## ABP scanner



Laser scanner for scanning of contour of straight pre-cut part enables localization of part position in ABP feature – additional cutting of bevel for weld edge preparation.



## Oxyfuel / G-Multi



Oxyfuel tool station with manual tilting possibility up to  $\pm 45^\circ$ . Fully automatic gas console with preset parameters ensures stable quality of cuts and best efficiency. Multi-tool version enables stripe cutting with stripe width  $\geq 70$  mm.



## Oxy triple torch



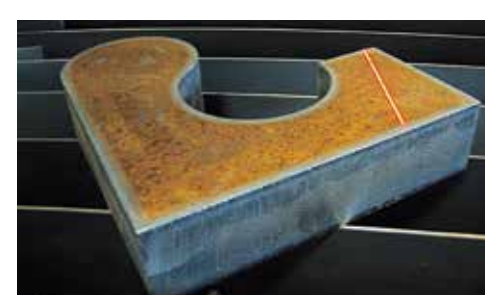
Oxyfuel triple torch with fully automatic gas console enables bevel cutting of V-, Y- and K-cuts with 3 oxy torches within bevel range  $20^\circ - 50^\circ$ . Tilting angle and span of torches can be set manually or automatically.



## Waterjet / W-Multi



Waterjet tool station for cutting of all types of materials. Multi-tool version can carry up to 4 water jets on a single Z lifter.



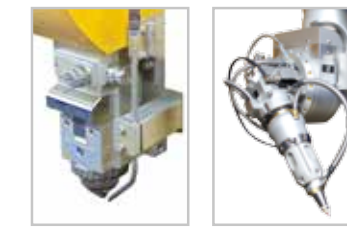
## Waterjet rotator



5-axis rotation head for waterjet cutting enables fully automatic bevel cutting of all types of materials with bevel up to  $50^\circ$ . ABC compensation of straight cuts and PHS THC are included by default.



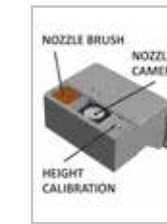
## Laser / Laser rotator



Laser tool station for CO2 or fiber laser cutting of various types of materials. Bevel tool station enables bevel cutting up to  $45^\circ$ .



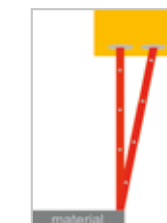
## Nozzle calibration



A combined station provides automatic calibration of capacitive height sensor in the laser head, brush cleaning of laser nozzle from possible spatters after fast piercing and camera check of the status of nozzle orifice.



## Automatic plate alignment



Laser sensor is scanning plate edges for automatic alignment of the plate with coordinate system. Supported is 3- or 5-point detection whereby 5-point detection also verifies the plate size.



## CCD camera



CCD camera can be used for:  
a) scanning of the shape of template or rest plate for conversion into DXF  
b) scanning of holes on plate for positioning



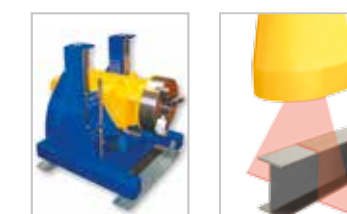
## Drilling & tapping



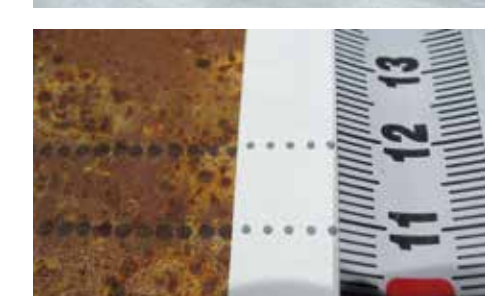
MicroStep offers a variety of drilling and tapping tool stations for several machine types reaching from small drilling heads for soft sandwich materials to big drilling and tapping units with internal cooling of tool and a possibility of automatic tool change.



## Pipe & profile cutting



Pipe cutting device is dedicated for clamping and turning of pipes and profiles. Together with a straight or bevel tool station and dedicated CAM software it offers the full range of pipe based applications.



## Inkjet



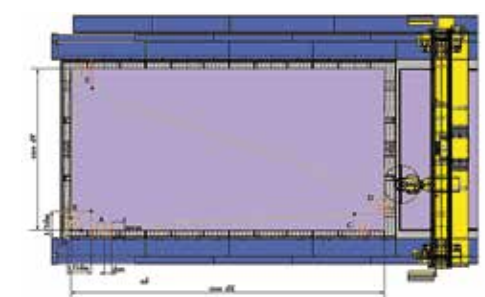
1, 7, 16 or 32-nozzles inkjet writer provides multi-purpose waterproof marking in industrial environment. It can write lines, characters, barcodes or 2D matrix. The marking speed reaches a notable 20 m/min.



## MicroPunch



MicroPunch marking unit is designed for fast marking of several types of materials – sheets, pipes, profiles - with differently machined surfaces. The material can range from plastics to hardened steel.



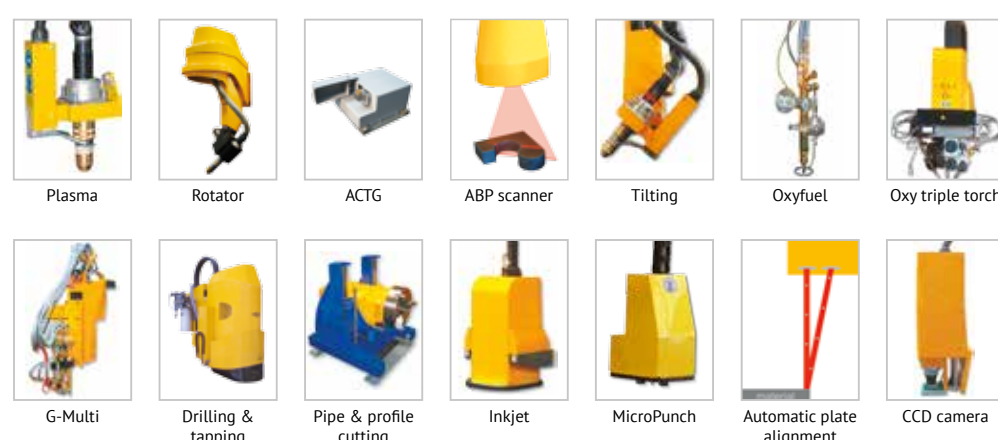


# MG CNC plasma & oxyfuel cutting machine



The MG series is MicroStep's top class CNC cutting machine suitable for long-term industrial use and meeting highest requirements on precision, performance and easy operation. MG machines provide a wide variety of applications: bevel cutting with

plasma and oxyfuel, pipe, profile, dome or elbow cutting, drilling with automatic tool exchange, plate positioning with laser sensor or a CCD camera, inkjet or MicroPunch marking. A special heightened version of the gantry allows oxyfuel cutting up to 250 mm.



MG 15501.35 Prk  
www.bosch.com



MG 13501.35 PrkII | MG 13501.35 PrI  
www.neptunemarineservice.nl



MG 51001.35 PrkI | MG 28501.35 PrkI | PLS 28501.35 PrI |  
PlasmaCut 12001.30 PGI | www.luerssen.de



## Bosch Heating Systems LLC / Russia

The Bosch Group is a leading global supplier of technology and services. Its operations are divided into four business sectors: Automotive Technology, Industrial Technology, Consumer Goods, and Energy and Building Technology. The Bosch Group comprises Robert Bosch GmbH and its more than 360 subsidiaries and regional companies in some 50 countries – including sales and service partners. Bosch representation reaches out to 150 countries. MicroStep delivered a cutting system for a new production line to Bosch Heating Systems LLC in the city Engels (Russia).

## Dutch Steel Works BV / The Netherlands

Dutch Steel Works is partner of Neptune Shipyards, a maritime service provider specialized in workboats for the offshore and dredging markets. The services consist of new building, repair, refit, maintenance and charter. The company offers a broad range of products and services in the shipbuilding and ship-trading sector including tugboats, specialized workboats, multipurpose pusher tugs, crew boats, survey boats and pontoons, which they deliver all over the world. The shipyards cuts its own steel components for the hulls, with enormous precision and speed.

## Fr. Lürssen Werft GmbH & Co. KG / Germany

For more than 130 years, Lürssen has been designing and building ships to comply with the highest quality standards of systematic, precise manufacturing. As a result, the most advanced watercrafts are delivered on various locations of the Lürssen Group worldwide – including large yachts, special ships or most up-to-date naval vessels. To satisfy the cutting requirements of high-end shipbuilding, 4 complex MicroStep machines were installed in Lürssen's manufacturing sites Lemwerder and Wolgast (Peene-Werft).



# DRM-D CNC sheet & dome cutting machine



**D**RM-D is a heavy-duty CNC cutting machine designed for a wide range of dome, sheet and pipe applications. Its robust gantry allows a vibration-free operation of heavy equipment like automatic oxyfuel triple torches, a 90° rotator with a 1200 mm stroke of Z-axis, a 120° rotator for cutting of

3D shapes and other custom equipment. Along with the full range of sheet and pipe cutting possibilities, DRM-D offers special applications on domes like trimming, separation cuts, cutting of diverse openings, weld edge preparation and cutting of domes placed upside down.



**KONECRANES**  
Lifting Businesses™

MG 24001.35 Prk  
www.konecranes.ua



## ZAO Konecranes / Ukraine

ZAO Konecranes is a leading producer of cranes and crane equipment in Eastern Europe and the CIS countries. The company specializes in manufacturing of bridge-, gantry- and special purpose cranes as well as manufacturing of lifting and handling equipment, production of metal constructions and wholesale industrial equipment. The enterprise is a part of the Konecranes world-leading group of Lifting Businesses.



**STX Finland**

DRM 50001.80 IPrk  
www.stxeurope.com



## STX Finland Oy / Finland

STX Finland Oy has three shipyards in Finland. The Turku Shipyard is an experienced builder of cruise ships and other technically demanding specialized ships and offshore units. The Rauma Shipyard is known for ferries, research vessels, naval ships and multipurpose vessels. The Arctech shipyard in Helsinki is specialized in ice-breaking and ice-going offshore and arctic vessels. STX Finland Oy belongs to the STX Europe Group, an international shipbuilding company.



**WACKER NEUSON**

MG 6001.25 BGPrk + CH500P  
www.wackerneuson.eu



## Wacker Neuson Kragujevac d.o.o. / Serbia

Wacker Neuson is one of the leading manufacturers of light and compact construction equipment, with more than 40 subsidiaries, 140 sales and service stations and over 12,000 sales and service partners worldwide. The enterprise is the partner of choice for professional users in construction, gardening, landscaping and agriculture, as well as among municipal bodies and companies in industries such as recycling and energy.



# DRM-B CNC drilling machine

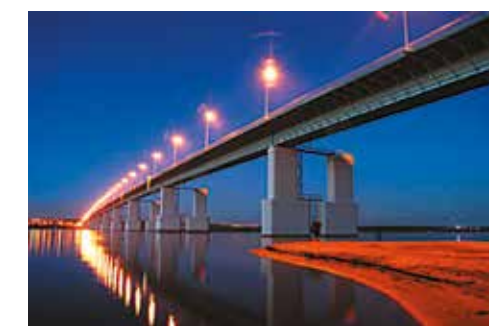


The DRM-B machine is dedicated to heavy-duty CNC drilling of construction sheets, tube sheets for heat exchangers and other demanding drilling jobs. The machine is equipped with a special drilling table with drill-protective flats and a rotary tool magazine for

16 tools. Optionally plate marking by inkjet or MicroPunch is possible. The machine finds its application in bridge or building construction companies.



MG 6001.15 PrkGB + CH800P  
www.mauchleag.ch



DRM 28001.36 BI  
www.kurganstalmost.ru



MG 6001.20 PrkBMG  
www.raba.hu/jarmu

## Mauchle Metallbau AG / Switzerland

Supporting construction solutions from steel, stylish chrome steel swimming pools and elegant metal constructions – these are the products which made this traditional engineering company famous throughout Switzerland. A sovereign combination of aesthetics and technology beyond the ordinary – this is the core competence of Mauchle Metal AG from Sursee (CH). The company designs, produces and assembles steel constructions, metal constructions and swimming pools in which the perfect design merges with engineering excellence.

## Kurganstalmost ZAO / Russia

ZAO "Kurganstalmost" is Russia's leading enterprise in manufacturing of bridge steel constructions. With an annual production output of 65,000 tons the company covers 25 % of Russia's bridge construction market. The basic competitive advantage of the company is manufacturing of complex steel constructions for individual projects. Bridges manufactured at the plant in Kurgan can be found in cities from the Far East to Europe: Germany, Turkey, Afghanistan, Laos, China, Kazakhstan, Belorussia as well as many Russian cities and towns.

## Rába Jármi Kft. / Hungary

Rába Jármi Kft., together with its international partners, is an exclusive supplier of off-road military vehicles for the Hungarian Defence Forces until 2018. In addition, Rába's capacities and experiences include manufacturing chassis for buses, construction vehicles and commercial vehicles. The military supplies include vehicles in 5 off-road vehicle classes and are a result of a long design work in accordance with modern military technical demands. The vehicles can be transported by rail, by air, they are equipped with an anti-reconnaissance system and as an option they can be fitted with an armouring kit.



# CombiCut CNC plasma & oxyfuel cutting machine

This robust and high-precision CNC machine is designed especially for multiple-shift high-performance plasma and oxyfuel cutting. It allows cutting of steel up to 300 mm, bevel cutting with a pair of rotary oxyfuel triple torches or plasma rotators, simultaneous cutting with more than 10 torches, drilling up to Ø 40 mm, inkjet or MicroPunch marking, pipe and dome processing.



CombiCut 12001.20 PrkGB + CH800P  
www.tubus.com.hr

## Tubus d.o.o. / Croatia

Tubus d.o.o. is a supplier of complex plumbing and fitting equipment for shipbuilding and off-shore industries with experience on the market since 1995. With a production facility of 2,500 m<sup>2</sup> it serves both Croatian and European customers. In order to provide excellent services, the company introduced the ISO 9001:2008 quality management system. The machine park of Tubus includes a 10 ton crane and modern CNC machines for processing of plates, profiles and pipes.



CombiCut 6001.20 PrkG + CH800P  
www.tatneft.ru

## TATNEFT OAO / Russia

The internationally recognized company TATNEFT is one of the largest Russian oil companies. The company's production accounts for about 8% of all crude oil produced in the Russian Federation and over 80% of crude oil produced in the Republic of Tatarstan. Apart from domestic production the company follows a strategy of continuous expansion of the production base to outside territories including the CIS and the Middle East countries. Activities of the company – production of oil, gas and petrochemical products – comply with high standards of environmental and industrial safety.



CombiCut 16501.30Prk + P  
www.reservoirspauchard.com

## Réservoirs X. PAUCHARD (Fayat) / France

Réservoirs X. PAUCHARD is one of the 4 pressure vessel companies of the Fayat group. Specialising in fluid management (pressure, filtering, exchange, "vacuum"), the company produces 50 to 50,000 litre tanks that can resist up to 120 bar of pressure. Founded almost a century ago in Autun in East France, the company is equipped for all stages of the manufacturing process - shearing, punching, rolling, drawing, folding, assembly, painting and hot-dip galvanising.



# PLS CNC plasma cutting machine



**P**LS is a high-precision CNC cutting machine with outstanding dynamic properties and modern design, developed especially for high precision plasma cutting. The excellent dynamics is achieved thanks to a double-side driven gantry, high-precision linear guidelines and a drive system with helical racks and pre-stressed pinions in all axes. Besides standard accessories (plasma, oxyfuel, marking) the machine can be also equipped with a pipe cutting device.



## Caterpillar Inc. / Russia

Caterpillar is the world's leading manufacturer of construction and mining equipment, diesel and natural gas engines, industrial gas turbines and diesel-electric locomotives. The company also is a leading services provider through Caterpillar Financial Services, Caterpillar Remanufacturing Services and Progress Rail Services. For more than 85 years, the company has been making sustainable progress possible and driving positive change on every continent.



**CATERPILLAR®**



PLS 28501.25 PPI  
www.caterpillar.com



**FLINKENBERG**  
steel



MG 15001.30 PrkWrkWm  
www.flinkenberg.fi

## Oy Flinkenberg Ab / Finland

Oy Flinkenberg Ab is a family-owned business established in the year 1921. The Flinkenberg Steel Service Center specializes in selling and processing steel plates. Production services consist of four cutting technologies – water, laser, plasma and flame cutting – as well as reprocessing and finishing. Processed parts are delivered directly to customers' welding and machining cells. The excellent combination of modern machinery and the production management system guarantees reliable, cost-efficient and high-quality services.



**METALLBAU STEG AG**  
Stahl- und Anlagebau, Mech. Werkstätte



MG 6001.25 PrkB + CH1200P  
metallbau-steg.ch

## Metallbau Steg AG / Switzerland

Since 1970, the company Metallbau Steg AG is active in its former site Steg in the Swiss canton Wallis. The fields of activity reach from production of chemical equipment, construction and assembly of telecommunications equipment and mechanical engineering in general, up to mechanical components production. At present, the traditional family enterprise has 17 employees.

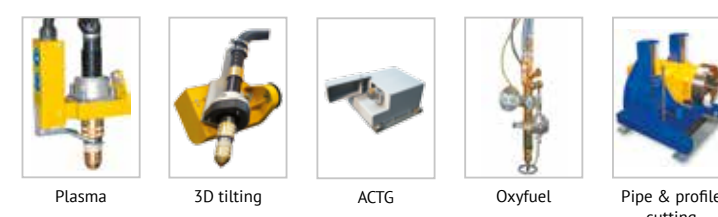


# MasterCut Compact CNC plasma & oxyfuel cutting machine



**M**asterCut Compact is a dynamic, high precision CNC cutting machine suitable for a variety of plasma and oxyfuel cutting jobs. Thanks to its sophisticated design and high quality of components it smoothly provides latest features of plasma technology for a decent price – true contours, small holes, sharp corners and efficient operation. As a fully com-

pact machine it is moveable within the workshop while delivery in a pre-assembled state significantly shortens the start-up time. Possible sizes of working area reach from 1.5 x 1.5 m to 6 x 2 m. As a bonus, the new 3D tilting tool station enables to perform a great portion of common bevel cutting jobs.



## OFAS S.p.A. / Italy

The family-run company OFAS (Officine Favero Attrezzi Stampati) is specialising in the production and supply of spare parts for the agricultural and construction industries as well as gardening equipment. To meet the ever-increasing demand for its products from Italian and international clients, the company expanded over the years (its founding dates back to the 1950s) and equipped its production with state-of-art technological machinery with the common aim – to offer a valuable, high-quality product, each step in the production of which has been carefully followed with attention, expertise and efficiency.



MSF-P 6001.20 P + 1.20 P  
www.ofas.it



CombiCut 6001.20 PrkB + CH1200P

## Factor EOOD / Bulgaria

Factor EOOD in Dupnitsa was established in April 2003 by Kiril Zarev. The company specializes in manufacturing and export of sound absorbers for industrial equipment, manufacturing of metal products and repair of equipment in thermal power plants. Since the introduction of CNC machines and programming software in 2012 the company enlarged its production in the fields of detail machining with a specialization in precision detail production and production of sound-absorbers for partners from Bulgaria and France (IAC Acoustics).



PLS 6001.15 PG + CH500 | MG 16501.25 Prk + 1.25 G + CH1200P  
www.stahlbau-finger.de

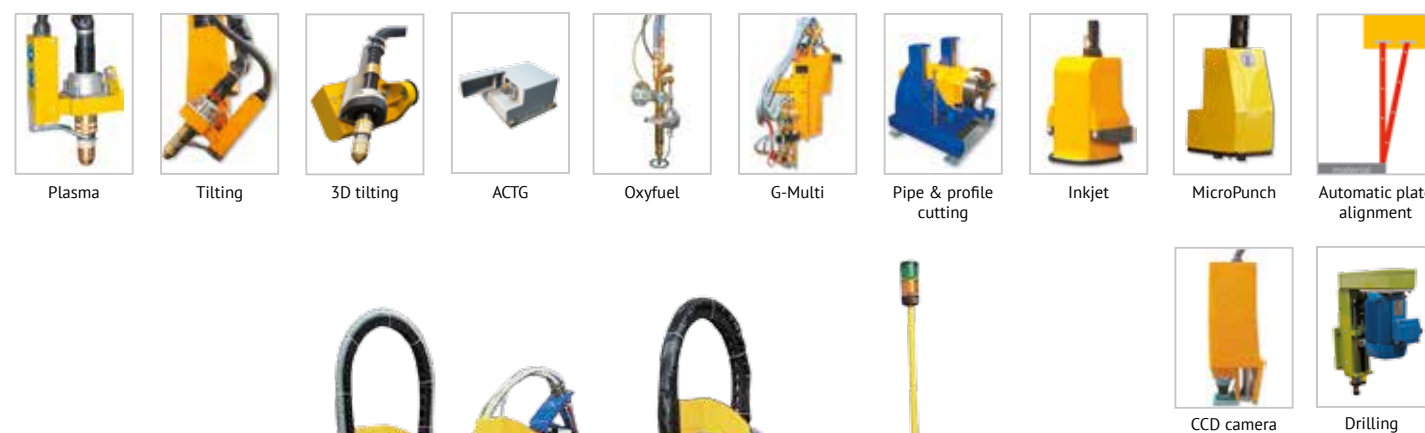
## Finger Schlosserei und Stahlbau GmbH / Germany

Founded in 1980, the company Finger Schlosserei und Stahlbau GmbH is a supplier for machine and equipment producers as well as provider of construction planning and installation services in steel constructions. Around 60 percent of company's turnover is made on orders from the public sector – e.g. bridge constructions, building constructions or furnishing of prisons. The company has 35 employees and is certified according to DIN EN 1090-2 EXC3.



# MasterCut CNC plasma & oxyfuel cutting machine

MasterCut is a versatile CNC cutting machine which can be applied throughout the industry reaching from small workshops to big factories. The application range of the entry version with rails in the X direction dedicated to fully automated oxy-fuel cutting or cutting with conventional plasma can be enhanced to a variety of high precision plasma cutting applications including pipe, profile or elbow cutting and marking. The new 3D tilting tool station enables to perform a great portion of common bevel cutting jobs.



**Thure Snijtechniek B.V.**  
Watersnijden Lasersnijden HD-plasma-snijden

AquaCut 12001.30 WWW | MG 12001.35 Prk  
www.thure.nl



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PLS 6001.20 PPr  
www.opalubka-lesa.ru



4 x CombiCut 28001.30 PPI | 2 x CombiCut 28001.30 PPI + 1.30 PPI  
www.zzmj.com

## Thure Snijtechniek B.V. / The Netherlands

Thure Snijtechniek B.V. was founded in December 2011 by Mark Ruiter. The company is the legacy of PWS Industrieel Snijwerk, a well-known name in cutting technology in the Netherlands. Thure Snijtechniek B.V. uses multiple cutting technologies like water jet, laser and plasma. Service is a key factor in company operations, all investments are made with top class delivery in mind.

## TD HozStroyInstrument OOO / Russia

The group of companies HozStroyInstrument is a leading Russian manufacturer of formwork, scaffolding and related steel structures. The company produces various kinds of formwork equipment and components for almost all areas of monolithic construction from residential buildings to bridges and tunnels. Its wall, panel and bridge formwork systems as well as complex formwork structures meet the comprehensive needs of customers in the construction industry for already more than a decade.

## Zhengzhou Coal Mining Machinery (Group) Co.,Ltd. / China

The 1958 established state-owned company ZMJ is China's leading manufacturer of coal mining and excavating equipment with a domestic market share of over 45%. As one of the few manufacturers in China they are able to produce 3 of the 4 components of a complete coal mining system: hydraulic roof supports, armored-face conveyors and roadheaders. ZMJ's client base includes the biggest names among Chinese coal mining companies as well as foreign companies (Russia, Turkey, India etc.).

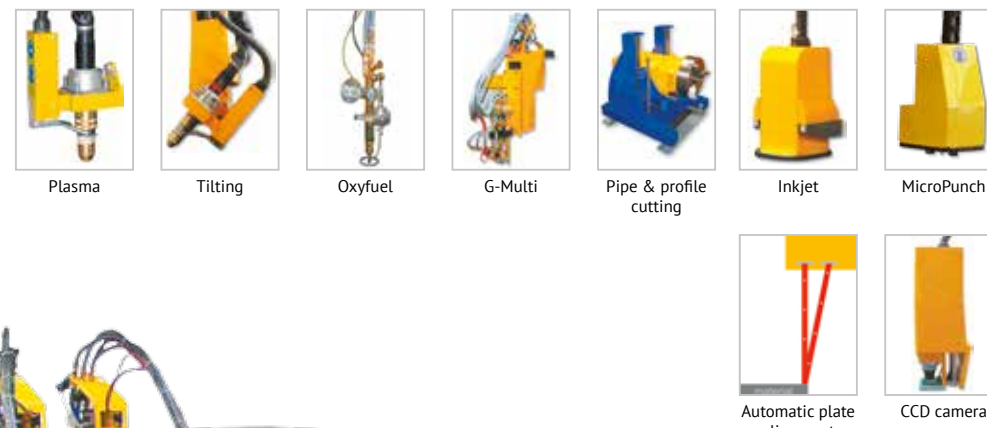


# OxyCut / PlasmaCut CNC plasma & oxyfuel cutting machine



OxyCut is a high-performance and reliable CNC cutting machine designed for fully automatic oxyfuel cutting or a combination of oxyfuel and plasma cutting. The machine is equipped with an advanced gas control system with automatic setting of cutting

parameters. Optional version of the machine – PlasmaCut – is equipped with high precision linear guide-lines to enable HD plasma cutting. Both versions can be equipped with a pipe positioner for cutting pipes up to Ø 1000 mm.



## Megras d.o.o. / Slovenia

The company Megras has been on the market for 20 years with an annual output of 3,000 tons of iron. The main field of activity is production of standard and customized metal rings and flanges for customers from Germany and Austria. The company provides also material processing services (plasma and flame cutting, water jet cutting, grinding, drilling, welding MIG/MAG, punching, bending, sandblasting), lifting and transport services and car towing. With operation in line with the ISO 9001 standard, the company's advantages include a high degree of flexibility and commitment to quality.



AquaCut 6001.25 WkP  
www.megras.si



AquaCut 3001.20 W | AquaCut 2001.35 WW | AquaCut 1201.25 W  
AquaCut 1501.20 W | AquaCut 1201.25 WW | AquaCut 1201.25 W  
AquaCut 1501.20 WW | AquaCut 6001.35 WW | AquaCut 6001.25 WW  
AquaCut 1501.25 WW | AquaCut 2001.30 WW | AquaCut 2001.30 WkP  
AquaCut 6001.30 WW | www.awac.cz

## AWAC spol. s r.o. / Czech Republic

AWAC was established in 1990 with the aim of offering high quality water-jet job cutting as well as sales of cutting machines. Located in 4 sites across the Czech Republic, the company directly employs 75 people and another 30 in the subsidiary AB Jet s.r.o. Offered cutting range with thicknesses 0.1 - 250 mm reaches up to plate dimension 3 x 6 m and pressure 6,000 bar, both 2D and 3D cutting (up to 60°) with vertical edge compensation. With its 19 machines, AWAC is the largest water-jet job shop in Europe.



MSF 3001.15 L + T200  
www.mat-ood.com

## MAT OOD / Bulgaria

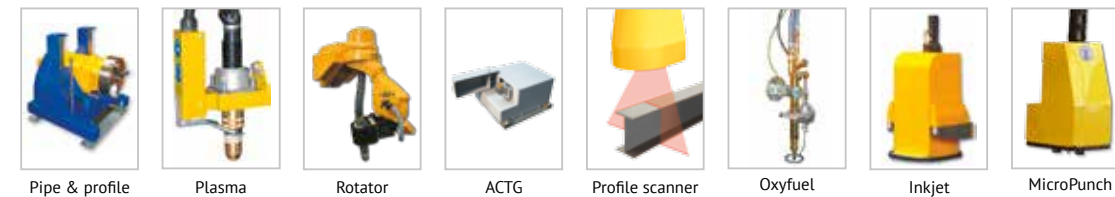
The Razgrad-based company "MAT" OOD produces metal structures for photovoltaic power generators, emergency clamps for elimination of emergencies on water supply networks as well as non-standard equipment for the metal processing industry and constructions for civil engineering. In recent years, the company became popular thanks to its accuracy, speed, reliability and flexibility. Production of the company is compliant with the comprehensive quality management system – international standard BS EN ISO 9001:2008.



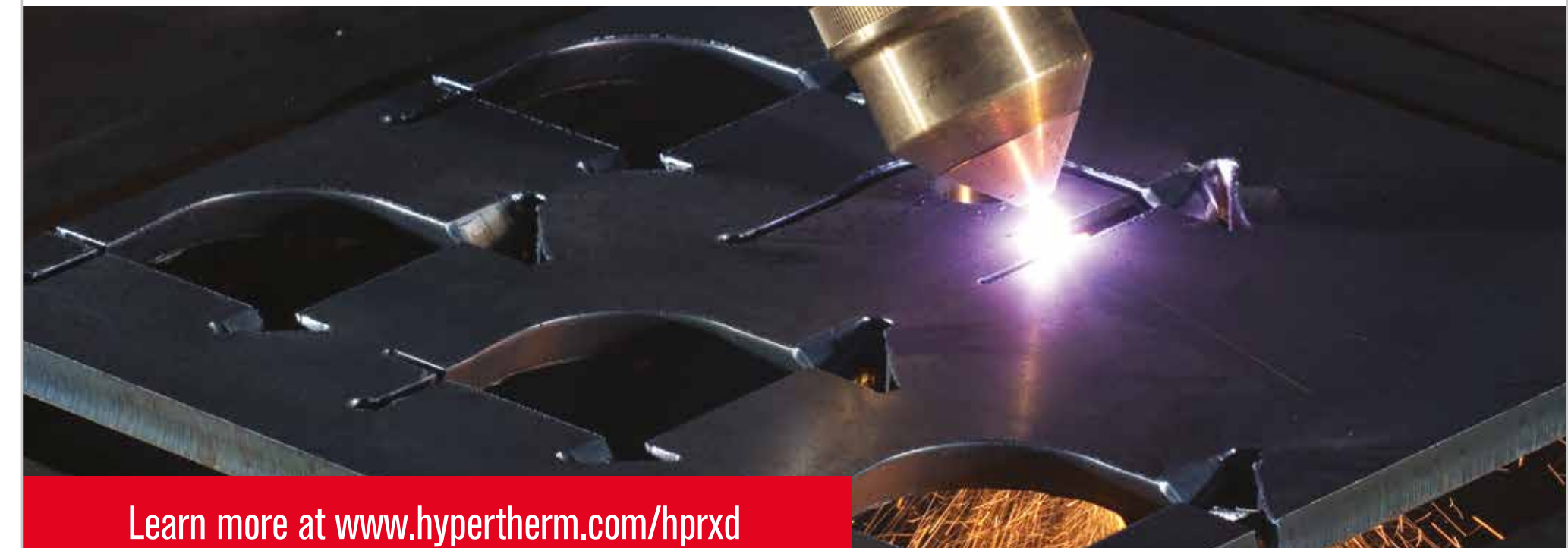
# PipeCut CNC pipe & profile cutting machine



**P**ipeCut machine offers a wide range of pipe and profile cutting possibilities for various industrial applications in offshore, lifting and agricultural equipment, pipelines, power plant and steel constructions or shipbuilding. Modular design of this machine allows to meet unique pipe fabrication needs and thus become a valid part of client's production facility.



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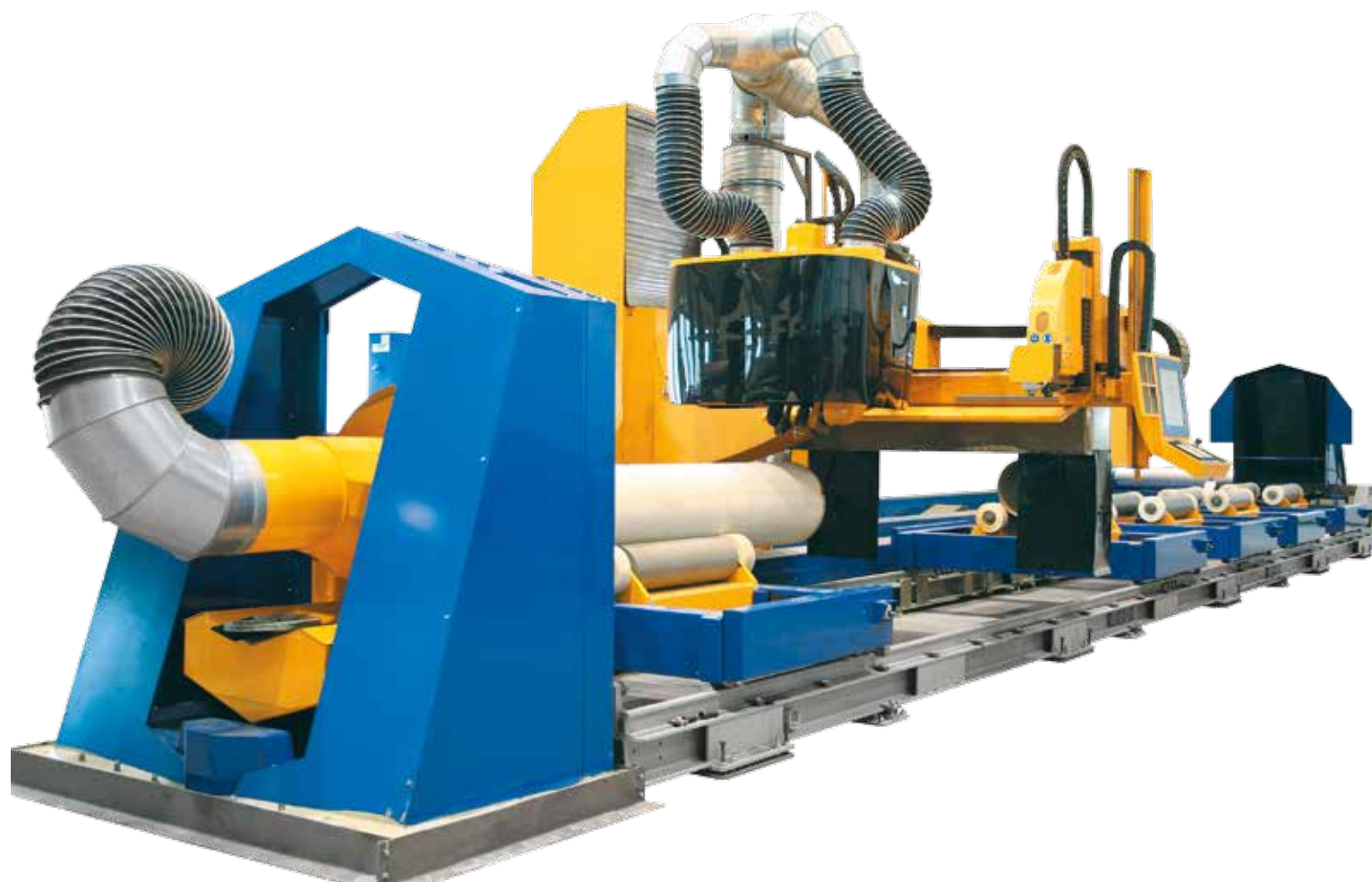
PLASMA | LASER | WATER JET | AUTOMATION | SOFTWARE | CONSUMABLES



# CPCut CNC pipe & profile cutting machine



CPCut is a pipe and profile cutting line designed for processing of a great range of pipe diameters and lengths. The machine's modular design and variable execution enables a wide range of pipe based applications including trimming, cutting of various openings for multiple pipe and profile intersections or connections, weld edge preparation as well as pipe marking. The application field is in tank, pipeline and power plant constructions.



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High Cutting Speed – best Quality – long Lifetime – low Costs

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## neo: Efficient Plasma Cutting on Highest Level

neo is the new upgrade of the HiFocus series and is now standard in the plasma cutting units:

HiFocus 130i neo, HiFocus 161i neo, HiFocus 280i neo, HiFocus 360i neo, HiFocus 440i neo and HiFocus 600i neo.

### Advantages

- High cut quality and speed with Contour Cut and Contour Cut Speed
- Up to 43 % higher cutting speed than competitors
- Up to 31 % less cutting costs than comparable plasma cutting units
- Long consumable life
- Cutting range: 0.5 - 160 mm



Economic copper cathodes

	Cutting speed (mm/min)	Cutting output per shift <sup>(1)</sup> (m)	Cutting costs (%)
Standard unit	1810	434	100
HiFocus neo with CCS	2600	624	69

neo makes the difference → +43 % → +43 % ↘ -31 %

<sup>(1)</sup> 50 % cutting time, eight-hour shift

## HiFocus 600i neo: Cutting from 0.5 up to 160 mm

With a maximum cutting current of 600 A the plasma cutting system HiFocus 600i neo sets new standards:

- Cutting materials from 0.5 to 160 mm
- Suitable also for underwater plasma cutting and cutting with robots
- Marking and bevel cutting
- Equipped with Contour Cut and Contour Cut Speed



www.kjellberg.de

**Kjellberg Finsterwalde Group**  
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Cutting Equipment  
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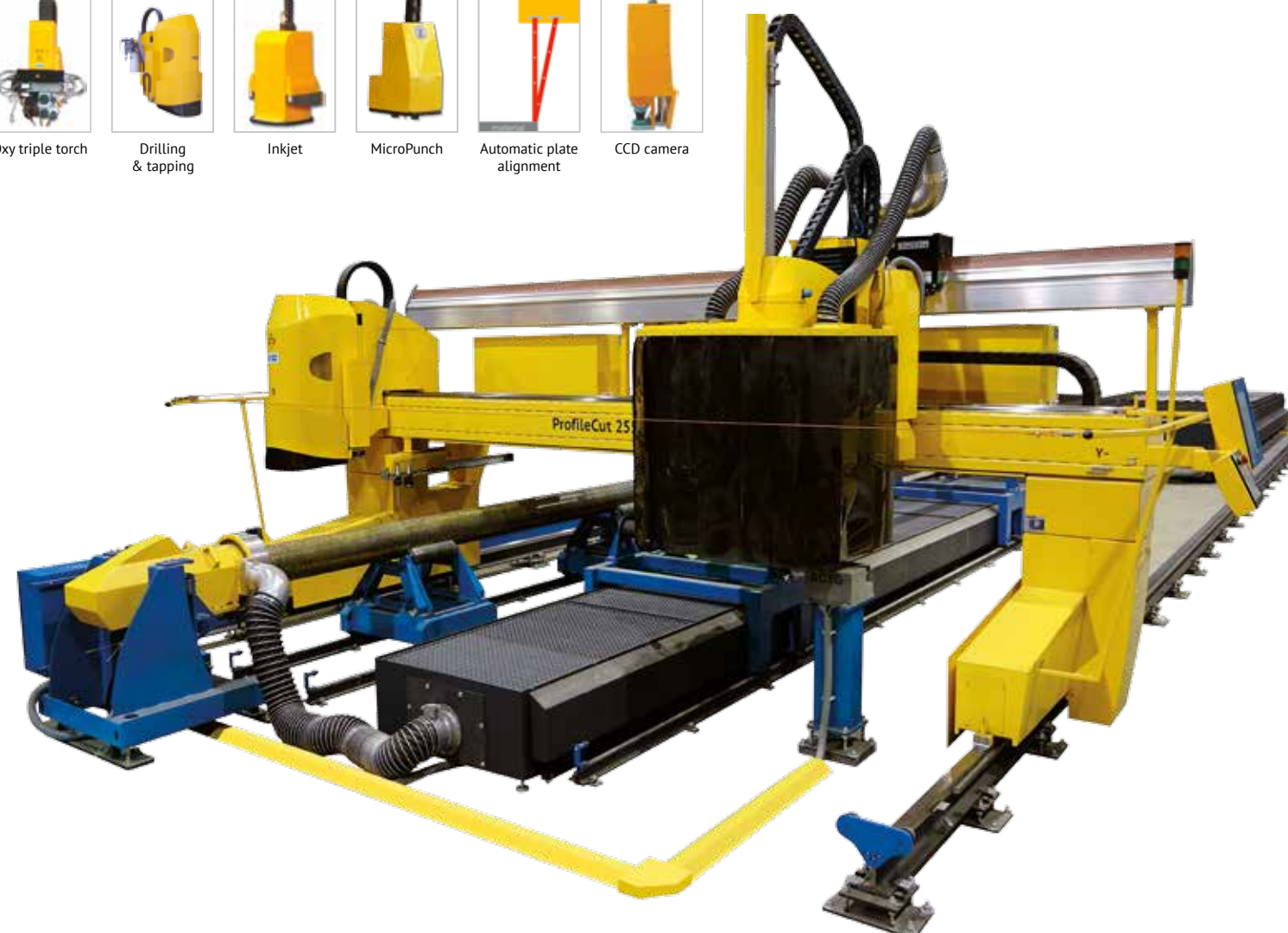
# ProfileCut CNC pipe, profile & sheet cutting machine



**P**rofileCut is a variable machine dedicated for production of steel structures. Besides optional pipe, rectangular profile- and sheet cutting zones it has a dedicated zone for cutting of structural profiles such as I, U or L. To enable precise division as well as cut-outs in required spots on the beam, the machine is equipped with a laser scanner for measuring of the exact shape of profile in the place of cutting which allows the control system to adjust the movement of tool according to the true shape of profile. In addition, the machine offers drilling and marking operations on beams.



Pipe & profile cutting, Plasma, Rotator, Rotator 90°, 3D rotator 120°, ACTG, Profile scanner, ABP scanner, Oxyfuel, G-Multi, Oxy triple torch, Drilling & tapping, Inkjet, MicroPunch, Automatic plate alignment, CCD camera



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*HeavyCut™ Technology provides the best cut quality, precision and parts life with XTremeLife™ Consumables on thicker mild steel up to 50mm.*

*Diameter PRO™ Technology integrates with the intelligent iCNC XT to deliver outstanding hole quality on mild steel and aluminium.*

*Water Mist Secondary (WMS™) optimizes non-ferrous cutting WMS delivers excellent non-ferrous cut quality and low cost of operation by using nitrogen as the plasma gas and ordinary tap water as the secondary gas. The fastest process for cutting non-ferrous metals with significantly higher cut speeds than H35 cutting.*

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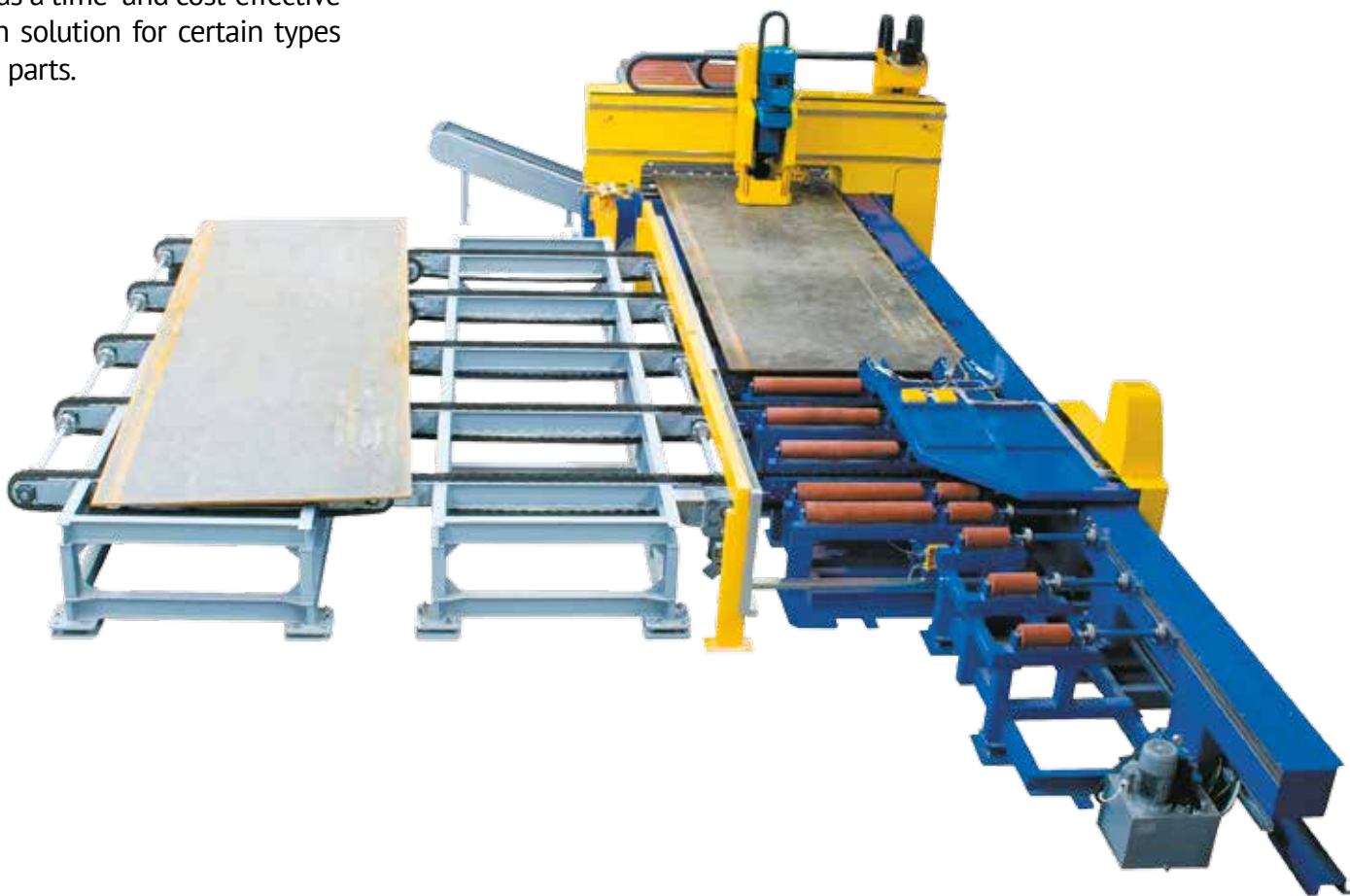


# DS Automated sheet processing line



**D**S is designed for high-efficiency drilling and cutting with the possibility of automatic plate feeding and automatic part sorting on output. The sheet processing line is dedicated to heavy-duty structural steel applications such as high-precision fittings, gussets and endplates.

The machine is designed for a high level of automation within the factory workflow as a time- and cost-effective production solution for certain types of flanged parts.



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# MSF Fiber laser cutting system



**M**SF machine is a powerful laser cutting system for cutting of materials with a fiber laser, or a combination of fiber laser and plasma. The machine is designed for production of highly accurate parts at high cutting speeds, with surprisingly low maintenance and operational costs. The outstanding dynamics of MSF is achieved by a low-seated gantry, digital AC drives and precise planetary gears. The machine is by default equipped with an automatic shuttle table.



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# MicroLas CO<sub>2</sub> laser cutting machine



The CO<sub>2</sub> laser cutting machine MicroLas is designed for applications with highest demands on accuracy and cutting speed in order to achieve minimum production costs for big series of parts. The sturdy machine frame together with linear guidelines and AC drives provide excellent dynamic properties. The machine is by default equipped with an automatic shuttle table.



Laser Pipe & profile cutting Automatic plate alignment



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In the "high power" range: the "Flexible Workhorse" CH 5000/6000 Watt laser has been added, as well as the FH 7000/8000 W lasers for thick cutting. All PRC lasers can be custom designed for easy integration into any kind of OEM-machine for cutting, welding, surface treatment, etc.



### FEATURES

All lasers are equipped with "oil free" Turbo compressors and Solid State High Voltage power supplies, "virtually" needing no maintenance. The excellent power and mode stability, the different pulse mode capabilities, in combination with the "high speed interface" guarantee perfect performance with the highest production throughput! The GL, PLS and CH series lasers, movable in both axes, offer very flexible and large size cutting and welding machine design!

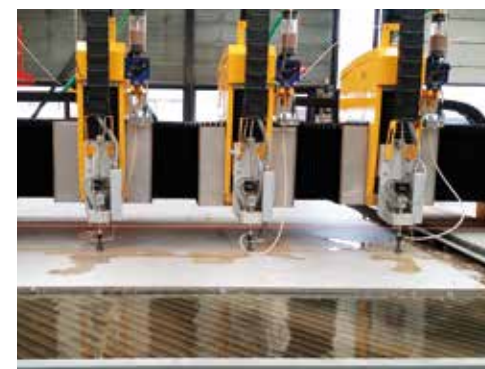
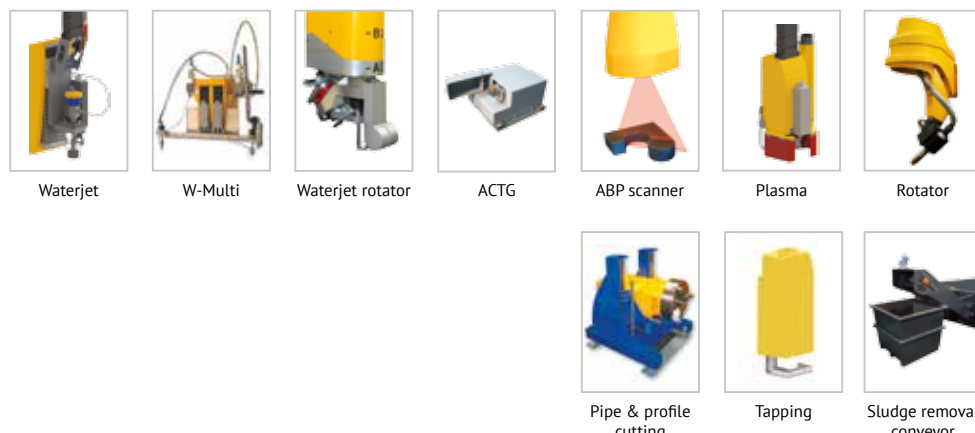
**Lowest Fast-Flow CO<sub>2</sub>-Laser gas consumption in the world.**



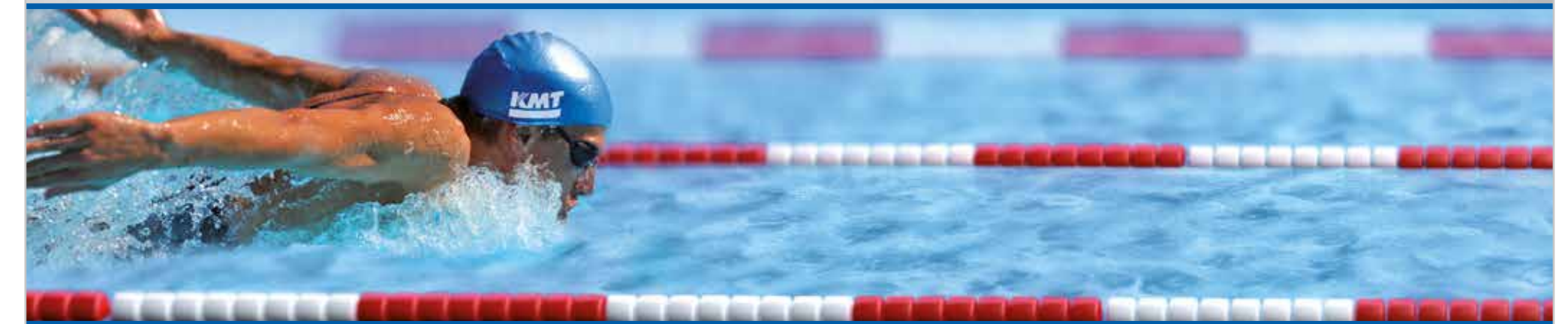
# AquaCut CNC waterjet cutting machine



AquaCut is a high-precision CNC cutting machine designed for processing of a wide variety of materials including those that cannot be subject to thermal or mechanical stresses. Pure water or abrasive cutting can be applied to metal, stone, marble, armoured glass, ceramics, plastics, wood, corrugated cardboard, foamed material as well as sandwich materials. The machine can be equipped with a 5-axis waterjet rotator as well as combined with plasma, pipe and profile cutting or tapping. ABC compensation of straight cuts and periodic height sensor (PHS) are new valid options.



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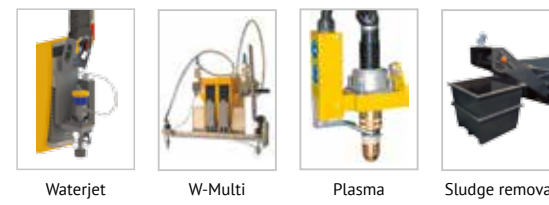
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# WaterCut CNC waterjet cutting machine



**W**aterCut is a high-precision and reliable waterjet cutting machine designed for straight waterjet cutting or a combination of plasma and waterjet. Besides a single tool station it can be equipped with a multi-tool station with outer span 1200 mm, carrying up to 4 water jets on one Z axis, or a small drilling unit for piercing of sandwich materials. The control system supports 5 cutting qualities with different edge finish by default.



## High Pressure Technology up to 12,000 bar

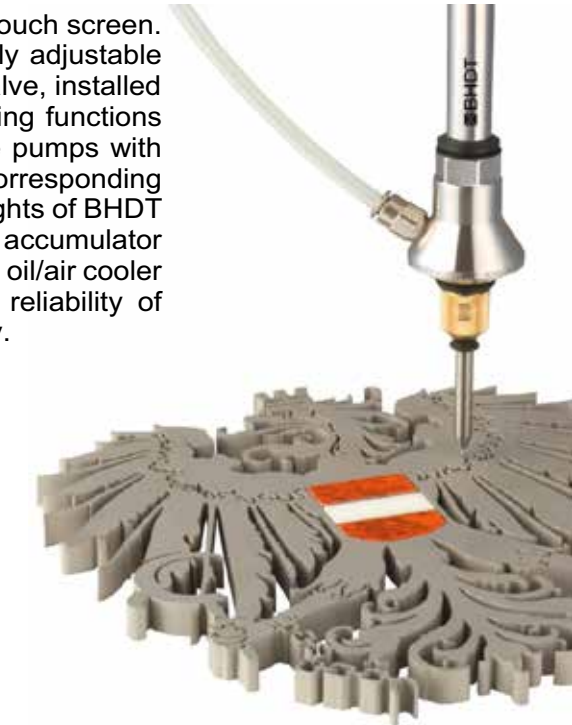
**Highest international standards, premium quality and reliability are a matter of course for BHDT.**

BHDT GmbH is the largest European manufacturer of high pressure pumps for operating pressures between 2,000 and 12,000 bar. The range of products includes pumps and components for waterjet cutting, peroxide dosing pumps for LDPE plants, pressure test units and autofrettage equipment.

High pressure pumps of SERVOTRON®, HYTRON® and ECOTRON® series are particularly suited for waterjet applications, designed as a turn-key unit. All components required for an efficient operation within a MicroStep waterjet cutting machine are fully integrated into a sound insulated housing.

The high pressure pumps come with touch screen. The pressure set value is continuously adjustable up to 4,000 bar via the proportional valve, installed as standard. All warning and monitoring functions are shown in plain text. Available are pumps with flow rates from 0.8 to 7.6 l/min and corresponding power rating from 7.5 to 75 kW. Highlights of BHDT high pressure pumps are large volume accumulator for low pressure fluctuation, integrated oil/air cooler as well as easy maintainance, high reliability of components and high energy efficiency.

BHDT GmbH, Industriepark 24  
A-8682 Hoenigsberg, Austria  
Phone: +43-3862-303-300  
Fax: +43-3862-303-304  
info@bhdtdt.at, www.bhdtdt.at



## More effective Dust Collection for thermal Cutting Applications

When it comes to the use of dust collectors for thermal cutting applications, the DFPRO Cyclopeel range sets a standard that is considerably higher in efficiency and performance. The high performance at low operating costs is a result of the innovative filter media Ultra-Web® in oval, high-performance filter cartridges. The Ultra-Web®-FR\* filter media with its flame resistant attributes meets the BIA classification M. Integrated preseparator systems provide additional safety against flying sparks. The DFPRO collectors are certified in compliance with ATEX. The range is available for extraction volume flows of 2,000 to 16,000 m³/h.

\*FR = Flame Retardant



**Donaldson**  
**Torit DCE**

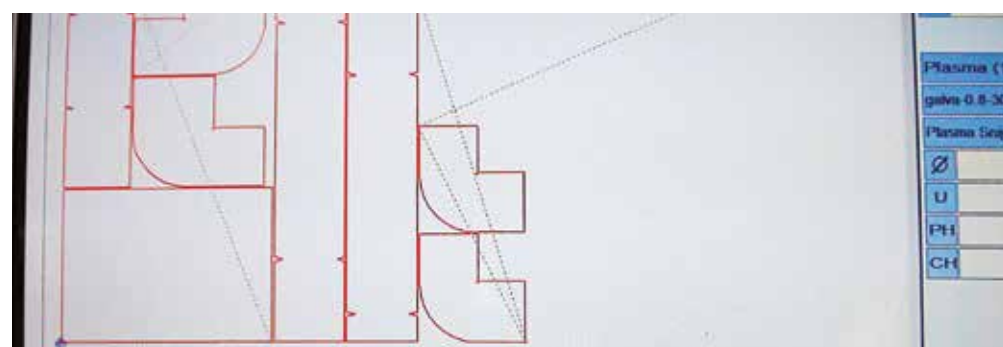
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Tel. +49 (0) 2594 781 41  
Fax +49 (0) 2594 781 89  
IAF-de@donaldson.com



# AirCut CNC plasma cutting machine



**A**irCut is a compact machine designed for cutting of ducting and sheet metals for the HVAC and food industries. Its light construction with an integrated fume extraction system fully reflects the requirements of cutting thin sheet materials. Since the machine can be equipped with both

arc voltage height control and a plate rider, it guarantees highly efficient operation from 0,5 mm to 15 mm thickness in mild steel, stainless steel or aluminium.



## Special solutions

**A**s a producer of machinery, control systems and CAM software MicroStep offers not only standard cutting machines but also delivery of special tailored solutions and machines for custom applications, solutions combining



different non-standard technologies on a single machine or production line, solutions for effective material handling as well as solutions respecting limited space conditions in customer's premises. Special designs include various shuttle tables, fork feeders, hydraulic lifting tables, cutting tables with built-in roller conveyors, chain conveyors, machines which combine plasma, waterjet and drilling technologies, plate processors, working cells for handling of workpieces by robot positioners and special-purpose welding machines.



## The new CAD/CAM generation for sheet metal



Alma, with almaCAM, opens up new horizons for the sheet metal CAD/CAM:

- An integrated system housing Alma's CAD/CAM software applications (2D/3D/Tubes cutting, punching, routing, robot welding, etc.) and a consistent environment for data and programming process management.
- An innovative CAM approach for increased productivity in the machine programming.
- An operating environment open to your IT system.
- A development platform for complementary applications: quotes, planning, workshop station, etc.

**alma**  
www.almacam.com



# MicroCut CNC plasma & oxyfuel cutting machine



**M**icroCut is designed to satisfy the demands for a machine with advanced plasma technology with respect to limited budgets and/or size requirements of workshops, small enterprises and schools. With the minimum working area of 1 x 1 m and the maximum of 3 x 1.5 m, MicroCut can be equipped with a single plasma or a single oxyfuel tool station. Maximum thickness

of oxyfuel cutting is 60 mm. A pipe positioner for cutting pipes up to Ø 100 mm can be included as option.



Plasma



Oxyfuel



Pipe & profile cutting



## Robot applications



working cells – different types of part positioners, gantry-type and cross-beam travel systems, safety fences and standardized modular welding cells are available. Recently finalized projects include design and delivery of various turnkey applications – welding of frames of tower cranes, ATV and snowmobiles, welding of high voltage capacitors, transformer tanks, conveyor rollers as well as milling of plastics, luting, relocation of aluminium casting molds or a test cell for partial simulation of a whole working line.

**M**icroStep's continuous activity in the area of robot applications resulted over the years in a comprehensive product line of components for robotic



Application possibilities for robots are endless. Also in your company.



Power and productivity for a better world™ **ABB**

ABB Robots are suitable for Welding, Assembling, Cutting, Deburring, Machine tending, Material handling, Packing, Palletizing, Gluing, Sealing, Grinding, Polishing, Painting and other applications. We offer products, solutions and related services that increase industrial productivity and energy efficiency. [www.abb.com/robotics](http://www.abb.com/robotics)

[www.abb.com](http://www.abb.com)

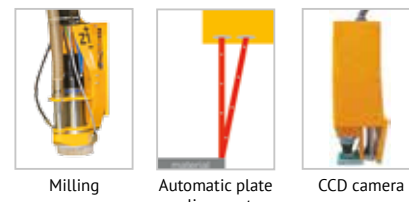


# MicroMill CNC routing machine



MicroMill machines are designed for 3D CNC milling of mild metals, plastics and wood by means of high-revolution spindles. Mechanical construction makes the machines suitable for shape machining of flat parts including parts with bigger dimensions. Utilising MicroMill's rugged frame, double-side driven gantry

and linear guideline system, the machine proves its excellent dynamic properties in various shaping jobs. The material can be fixed on the table with mechanical clamps, or conveniently locked in position on a MDF pad through a vacuum clamping system.



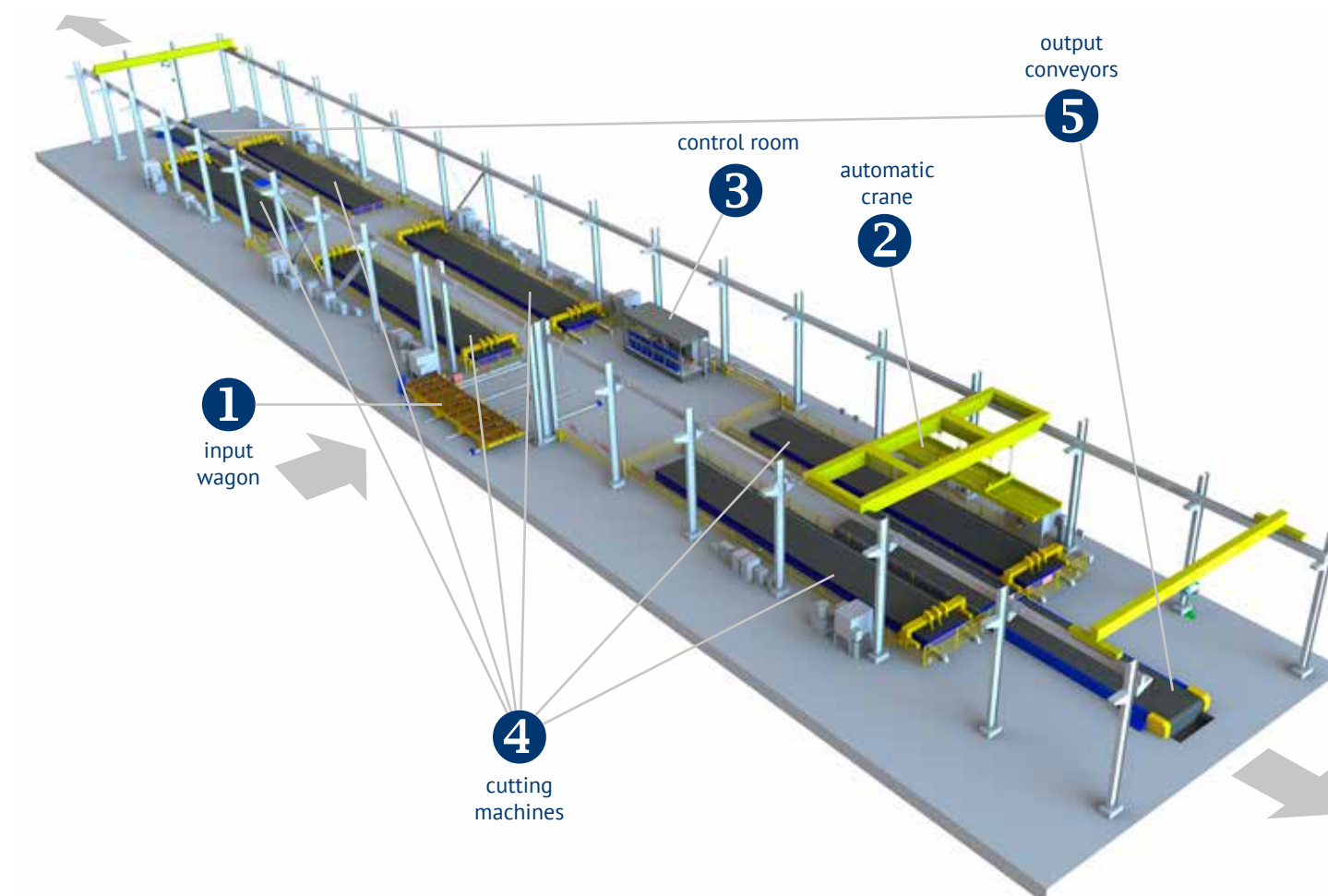
## Automatic cutting line

*Efficiency boost for high-volume manufacturing*

China's leading coal mining equipment producer Zhengzhou Coal Mining Machinery invested in 2013 into a unique fully automatic CNC cutting line built as a cooperation project of MicroStep, MicroStep-Puris and Terex Material Handling with its Demag brand. The line consists of 8 CombiCut machines with cutting area 28 x 3 m (each equipped with 2 HD plasma sources and an inkjet marker), 1 automated overhead travelling crane (9 t x 16.5 m) for automatic plate handling, 1 input wagon with

load capacity of 15 t and 2 output conveyors for collecting of cut parts and removing of waste material. The entire line is operated in a fully automatic mode by MicroStep's production management software MPM with integrated Demag software for crane management and material handling. The line replaced the standard oxy-fuel cutting production process. As a result of use of a modern HD plasma technology and first of all thanks to automation of production preparation, cutting plan distribu-

tion and material handling not only the cut quality could be enhanced significantly, but also the efficiency of part manufacturing could be increased by up to 75 % with one production cycle taking 1 - 2 hours instead of previous 4 - 8 hours. Furthermore the line increased the production volume of the factory by 40 % to 28,000 tons per month while the line itself is designed for processing 8,000 - 12,000 tons of mild steel per month in a three-shift operation.







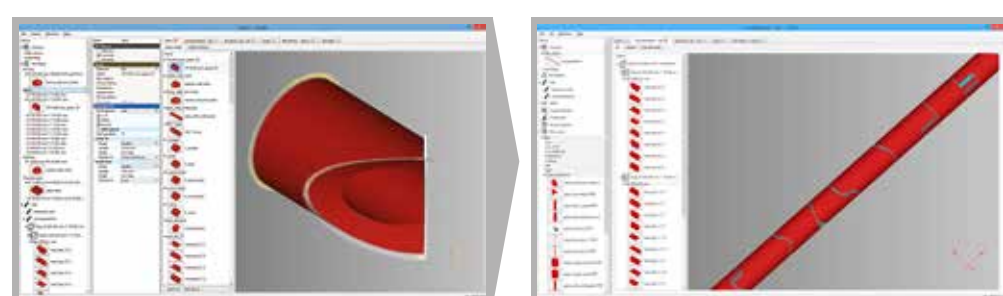
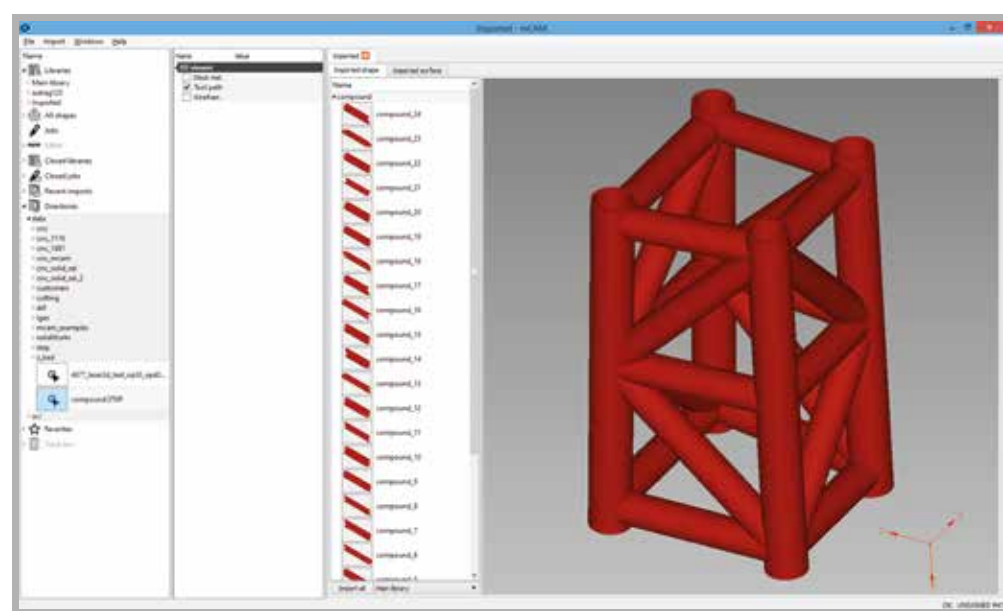
mCAM was developed within the project "Research of technology nodes on CNC machines for cutting of materials by energy-beam technologies" supported by the Ministry of Education, Science, Research and Sport of the Slovak Republic within incentives for research and development provided from the state budget under the Act no. 185/2009 Coll. on incentives for research and development.

## mCAM: 3D CAM for steel constructions

Massive expansion of 3D CAD systems over the last years has substantially influenced construction and preparation of production in mechanical engineering companies. This naturally resulted in a need of CNC machine programming based on 3D models of components. To address the need MicroStep took advantage of its 10+ years' experience in 3D cutting and launched mCAM – a powerful in-house developed tool for automated 3D manufacturing of structures from planar and 3D shapes commonly used in steel constructions – circular pipes, rectangular or IPE profiles, sphere segments or domes. mCAM allows users to import 3D

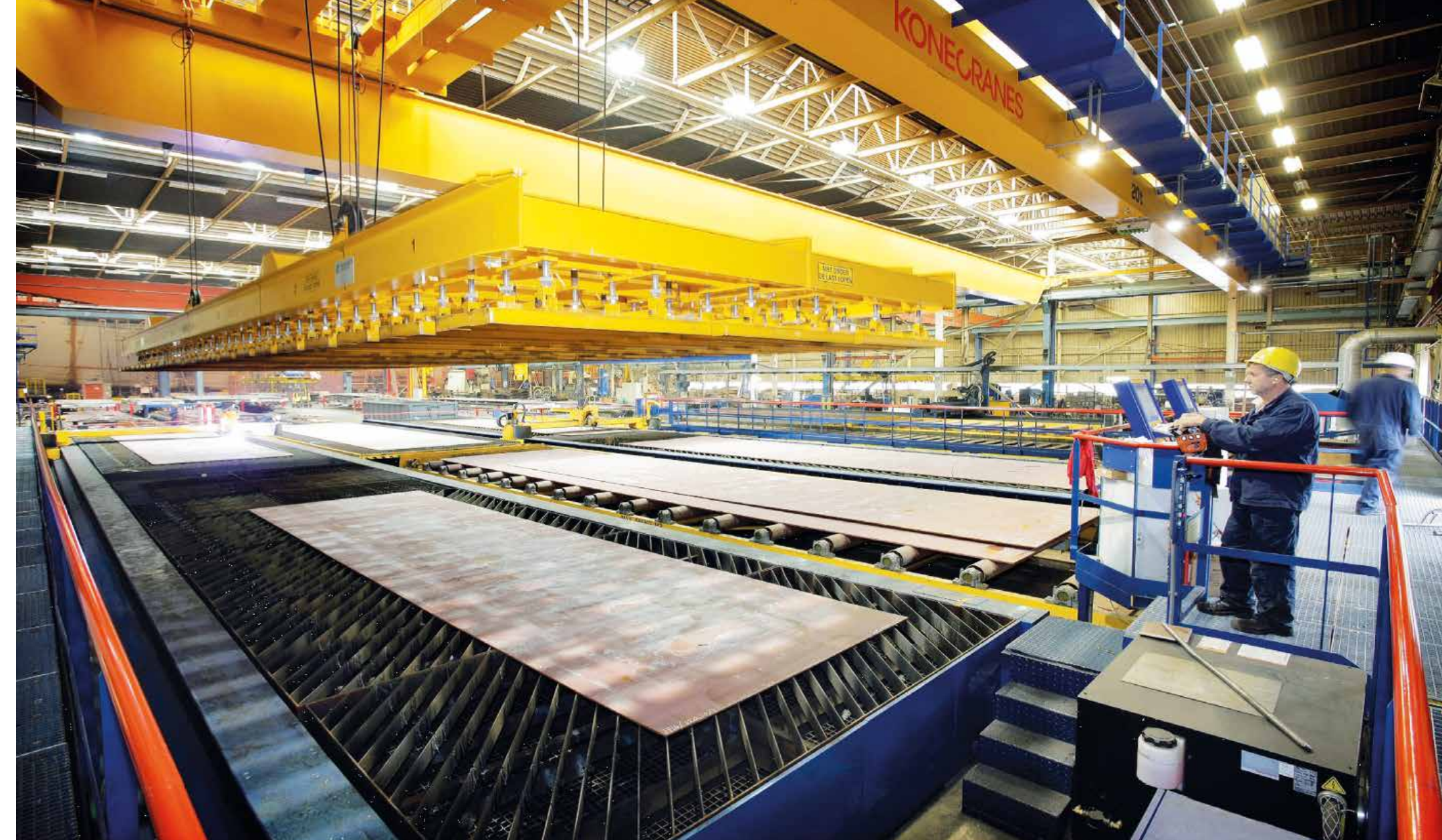
solid models in commonly used STEP or IGES formats, automatically sort all their elements according to the semi-product type, automatically nest them to achieve high utilisation of material and create cutting plans including all cutting parameters. It also supports cylindrical folding of flat patterns from 2D DXF, creation of unfolded cutting plans for cutting from metal sheets, micro-joints on long cutting paths and more. The software allows users to create libraries of frequently used parts, offers advanced visualization helpful previews and an embedded CNC simulator. mCAM can be integrated with ERP systems such as MicroStep Production Management. This gives

customers tools for maximum utilization of their production equipment. MPM creates cutting tasks for mCAM centrally, based on all incoming orders. mCAM then creates cutting plans and loads them to MPM's database. MPM assigns the plans with parameters to individual cutting machines and after completion updates the database so the status of individual orders can be monitored in real time. Its well-arranged user interface with drag-and-drop and context menus enables simple, highly efficient, and precise manipulation and setting of particular cutting paths and lead-ins/-outs.



mCAM report			
		Created:	06.08.2013 15:14:54
		Name:	compound_6 + 10
		File:	W:/compound_6 + 10.cnc
Stock: Round pipe: L: 12000.000 mm			
Stock: D: 193.700 mm T: 5.000 mm			
Chuck location: at X min			
	Starts	Length	
Cutting	22	18 m 316.861 mm	
Total	22	18 m 316.861 mm	

Preview	Info		Part name
	Starts	Length	compound_10
	Cutting	2 1 m 315.317 mm	
	Total	2 1 m 315.317 mm	
	Value		
	kerf	2.000 mm	
	size	L: 779.800 mm	
	Starts	Length	compound_14
	Cutting	2 1 m 453.901 mm	
	Total	2 1 m 453.901 mm	
	Value		
	kerf	2.000 mm	
	size	L: 779.800 mm	
	Starts	Length	compound_12
	Cutting	2 1 m 453.901 mm	
	Total	2 1 m 453.901 mm	
	Value		
	kerf	2.000 mm	
	size	L: 779.800 mm	



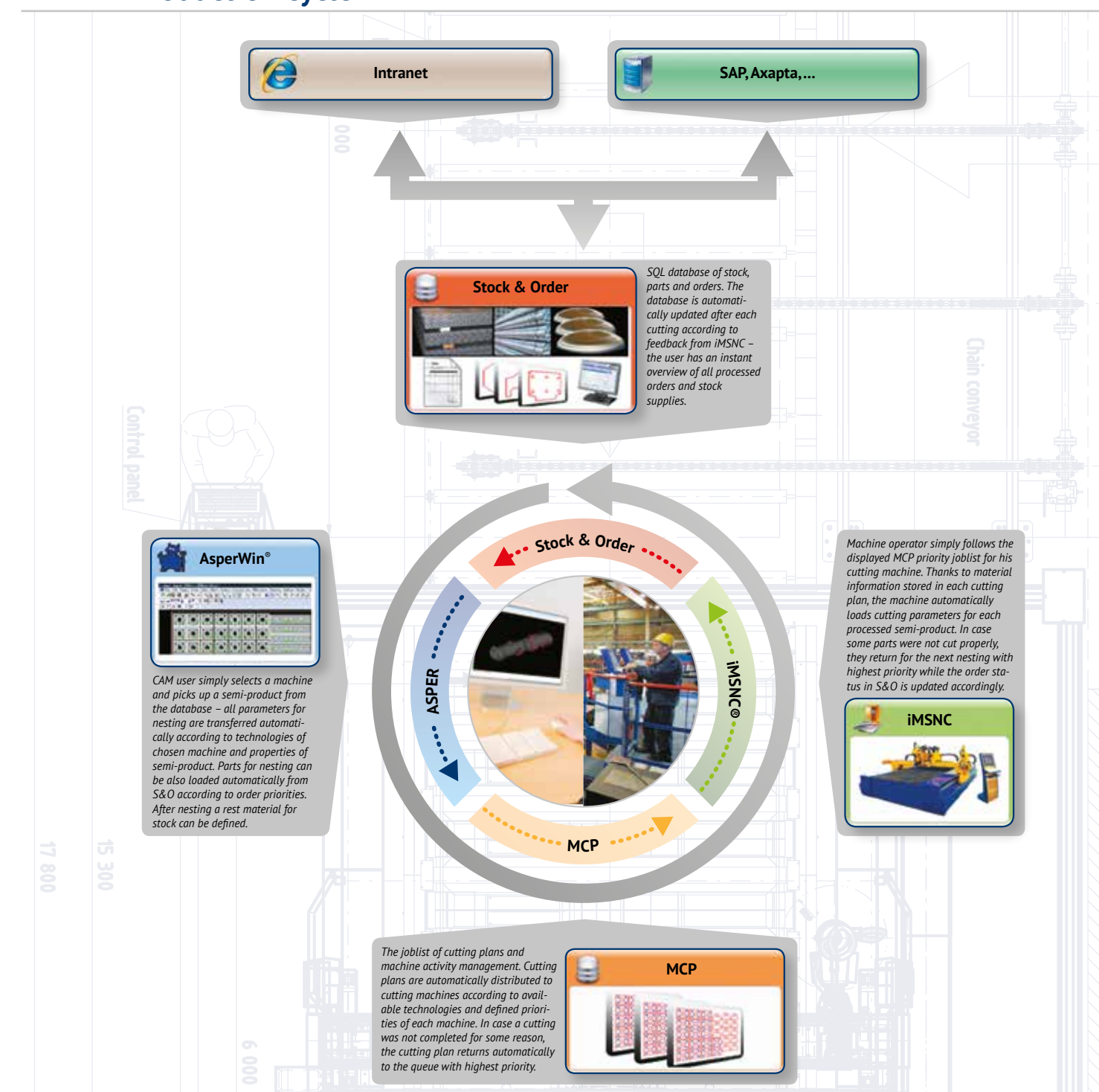
## MPM: MicroStep Production Management

MicroStep Production Management (MPM) provides computer-aided process planning (CAPP) features for automation of the workflow on CNC machine(s) or production lines. It is an integrated system of order processing, nesting, stock management, machine operation planning and evaluation which interconnects pre-production data, control systems of CNC machines and MicroStep's automatic nesting software AsperWin®. It helps to reduce work-in-progress, to save material, and to eliminate operator errors. Although designed for MicroStep machines with AsperWin® CAM and iMSNC®, MPM also offers possibilities of cooperation with third party machines. Naturally, the production data can be shared with customer's ERP system (e.g. SAP, AXAPTA). For effective production planning, the system provides weight analysis of particular orders along with weight reports of actual stock resources.

Order	Machine	Material	Quantity	Unit	Status	Remarks
1	ASPER	Steel	1000	kg	OK	
2	ASPER	Steel	1000	kg	OK	
3	ASPER	Steel	1000	kg	OK	
4	ASPER	Steel	1000	kg	OK	
5	ASPER	Steel	1000	kg	OK	
6	ASPER	Steel	1000	kg	OK	
7	ASPER	Steel	1000	kg	OK	
8	ASPER	Steel	1000	kg	OK	
9	ASPER	Steel	1000	kg	OK	
10	ASPER	Steel	1000	kg	OK	

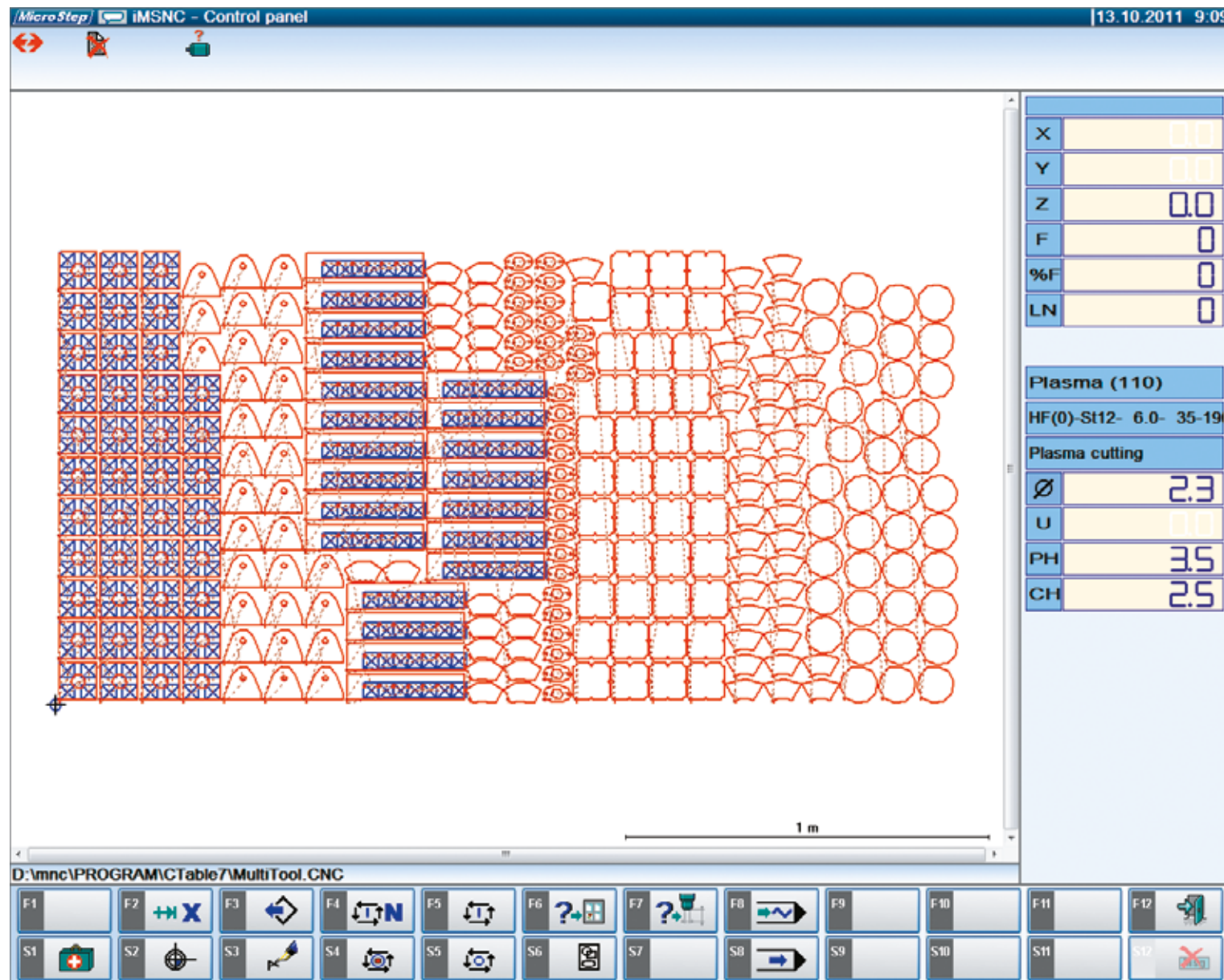
Order	Machine	Material	Quantity	Unit	Status	Remarks
1	ASPER	Steel	1000	kg	OK	
2	ASPER	Steel	1000	kg	OK	
3	ASPER	Steel	1000	kg	OK	
4	ASPER	Steel	1000	kg	OK	
5	ASPER	Steel	1000	kg	OK	
6	ASPER	Steel	1000	kg	OK	
7	ASPER	Steel	1000	kg	OK	
8	ASPER	Steel	1000	kg	OK	
9	ASPER	Steel	1000	kg	OK	
10	ASPER	Steel	1000	kg	OK	

### MPM – Production cycle





# iMSNC®



MicroStep iMSNC® is one of the most advanced control systems in CNC cutting machinery. The system provides easy, user friendly and thus reliable operation of cutting machines via modern user interfaces: a standalone operator console with TFT touch screen and one or two con-

trol panels with LCD displays on the sides of the gantry. To achieve maximum utilization and flexibility of machine operation, a standalone operator console allows to prepare and edit cutting plans simultaneously with the cutting process. Since the machine, the control system iMSNC® and the CAM software

AsperWin® are from one producer – MicroStep – it allows to implement non-standard requests and develop custom solutions as well.

Integrated parameter databases for different technologies ensure high efficiency and stable quality of cutting. The operation is quick and

easy through a touch screen with interactive elements with pop-up help.

Advanced Remote diagnostics tools enable direct remote control of the machine, control system and installed software and thus ensure fast and cost-saving maintenance via internet.

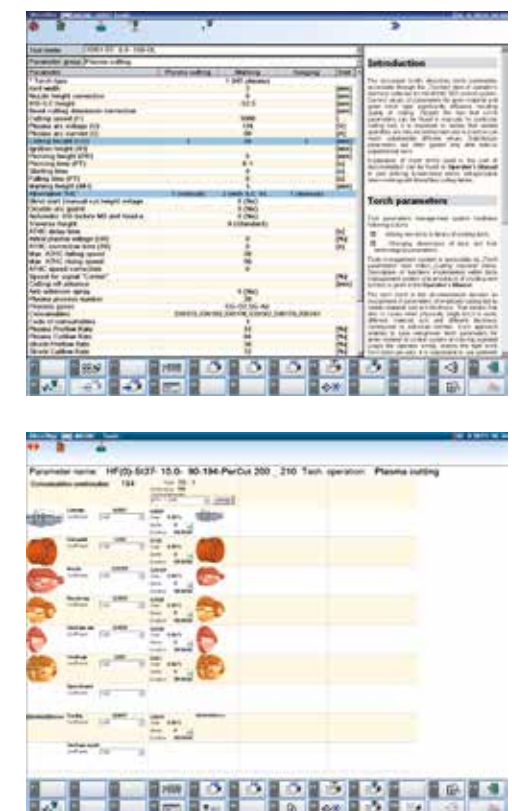
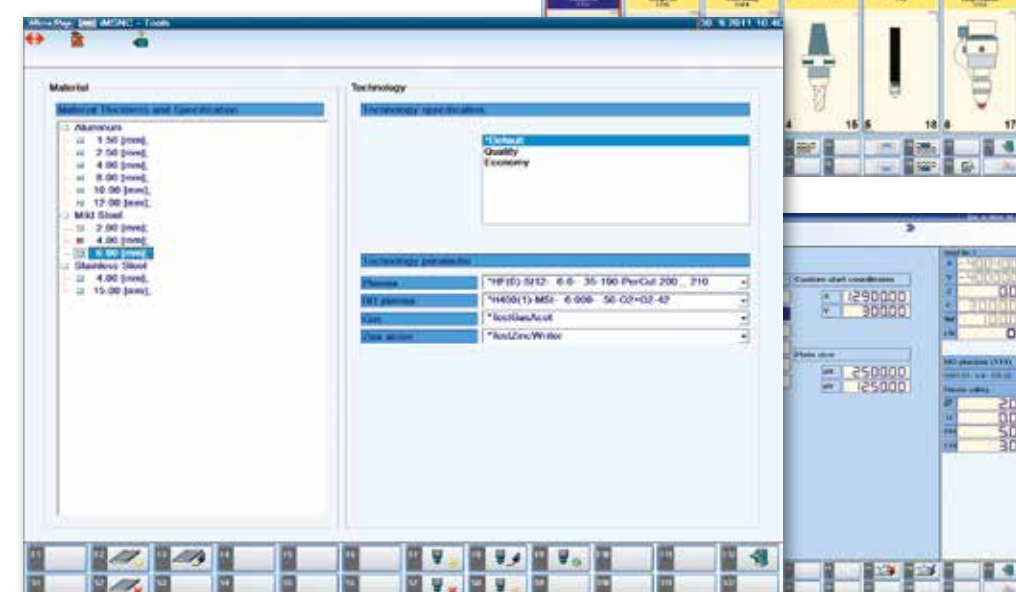
Intranet applications enable comfortable integration into the production workflow and provide access to each machine via SQL databases and web services.



## Features

Besides standard features (automatic setting of cutting parameters, torch height control of plasma via arc voltage, test run, mirroring, scaling, rotation of cutting plans...) iMSNC® incorporates advanced functions: preparation of cutting plans during machine operation, jog mode, reverse motion, global marking, parametrical dynamic piercing, kerf compensation, automatic plate alignment with a laser sensor or CCD camera, restart of cutting from point of interruption after voltage breakdown, virtual tool magazine – customized database of parameters for all technologies. Zone management (batch cutting) feature allows to divide the cutting table into independent zones with pre-defined

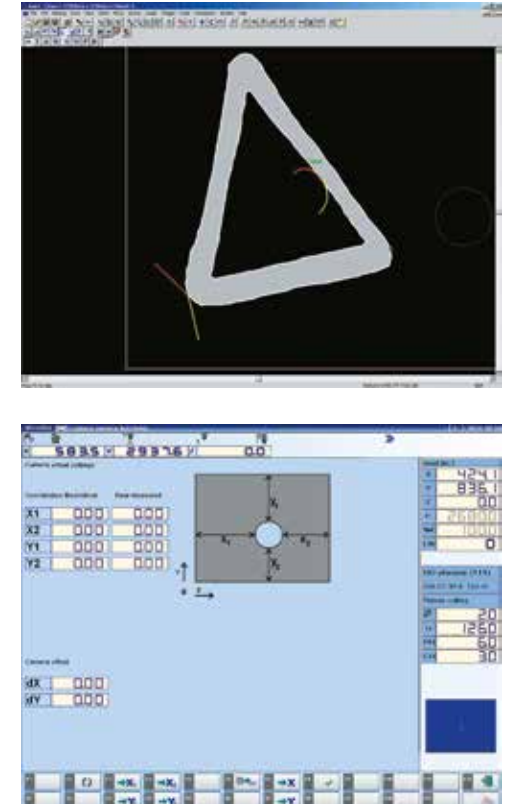
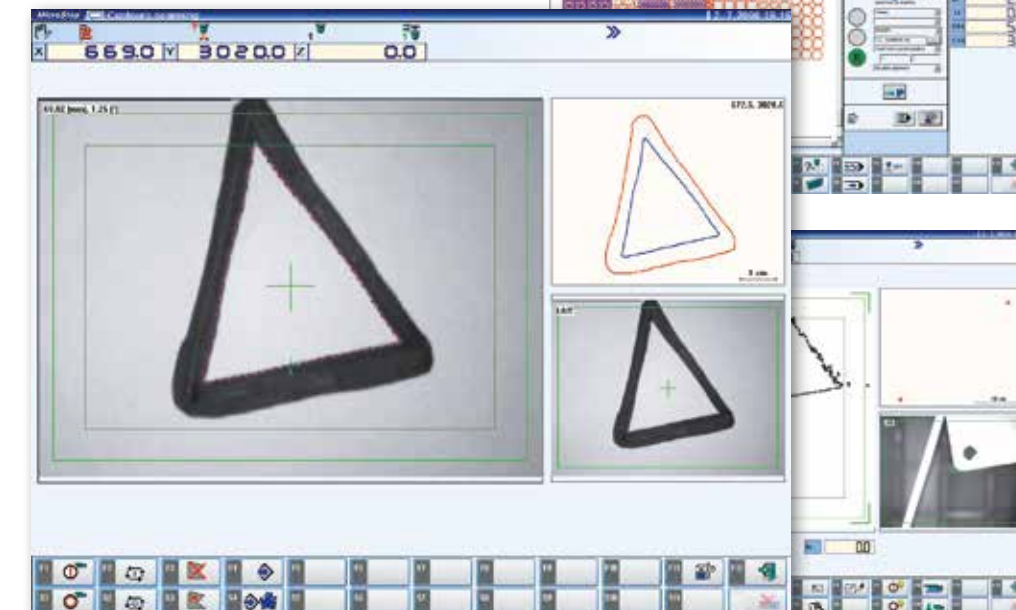
cutting plans for each zone to prevent delays when switching programs and increase production efficiency.



## Enhanced functions

Complex and yet unified structure of iMSNC® allows to control a variety of technologies in a very similar manner from the same user interface and also to automatically switch technologies within a single cutting plan (multi-tool operation). Besides controlling the machine's own devices (plasma, laser, oxy-fuel, water-jet, 3D mill, drill, camera, marking/writing with plasma, inkjet, zinc, water, micropunch) it can be equipped with an interface to control various external devices (cranes, exchange tables) in customer's premises. With a CCD camera the system provides a capability to scan non-trivial shapes of templates and convert them to

DXF files, or scan points on processed sheets for positioning.



## Intranet applications

iMSNC® includes a novel web-based interface for accessing each machine from the company intranet via a web browser. Each machine has its own home page which serves as a gateway for intranet applications.

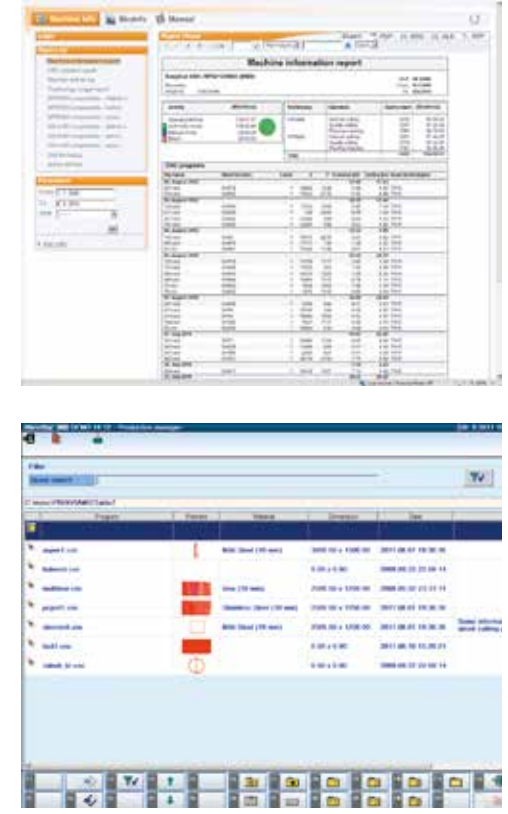
**Management of Cutting Programs (MCP)** – remote management of cutting programs allows to define priorities and relations between cutting programs and materials, and to distribute the cutting tasks to several machines

**Ekoinfo** – evaluation of machine operation costs for a particular cutting program

**Machine Info** – monitoring of machine and operator activities that enables to assign performance in-

formation to work shifts and to create specific technological records

**Manuals** – quick access to all electronic documentation related to the machine



## Service applications

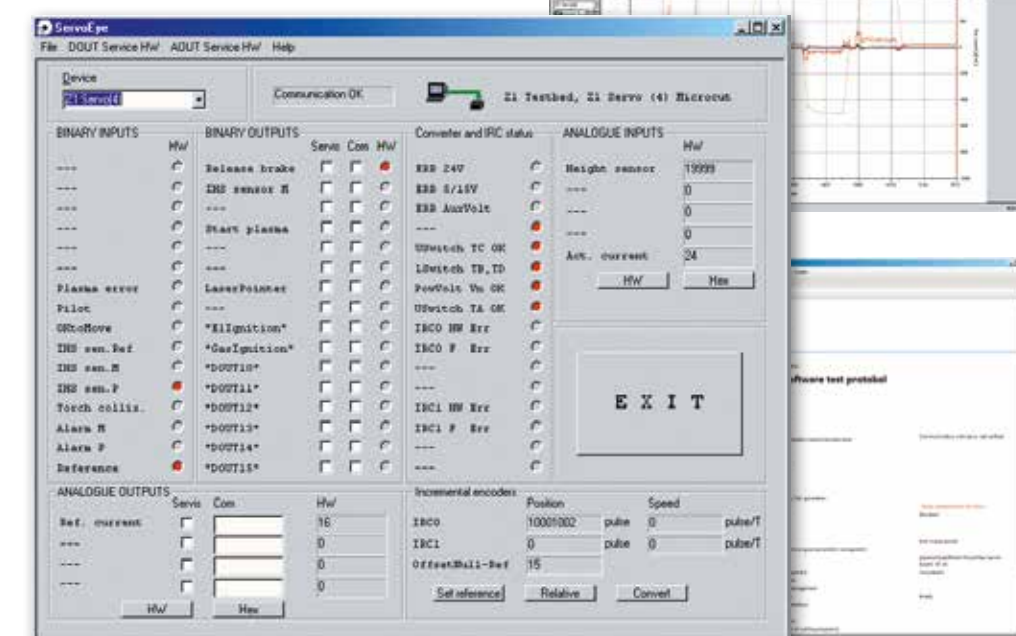
Advanced backup options:

**Local backup** - stored on machine's HDD preserves the history of changes. It can be used for evaluation of changes between the actual state and a history point or between any history points.

**Export backup** - particular configuration files, local backup point or the complete iMSNC® installation can be exported to an external medium and used for a later system restore – including all settings and parameter adjustments made by the operator

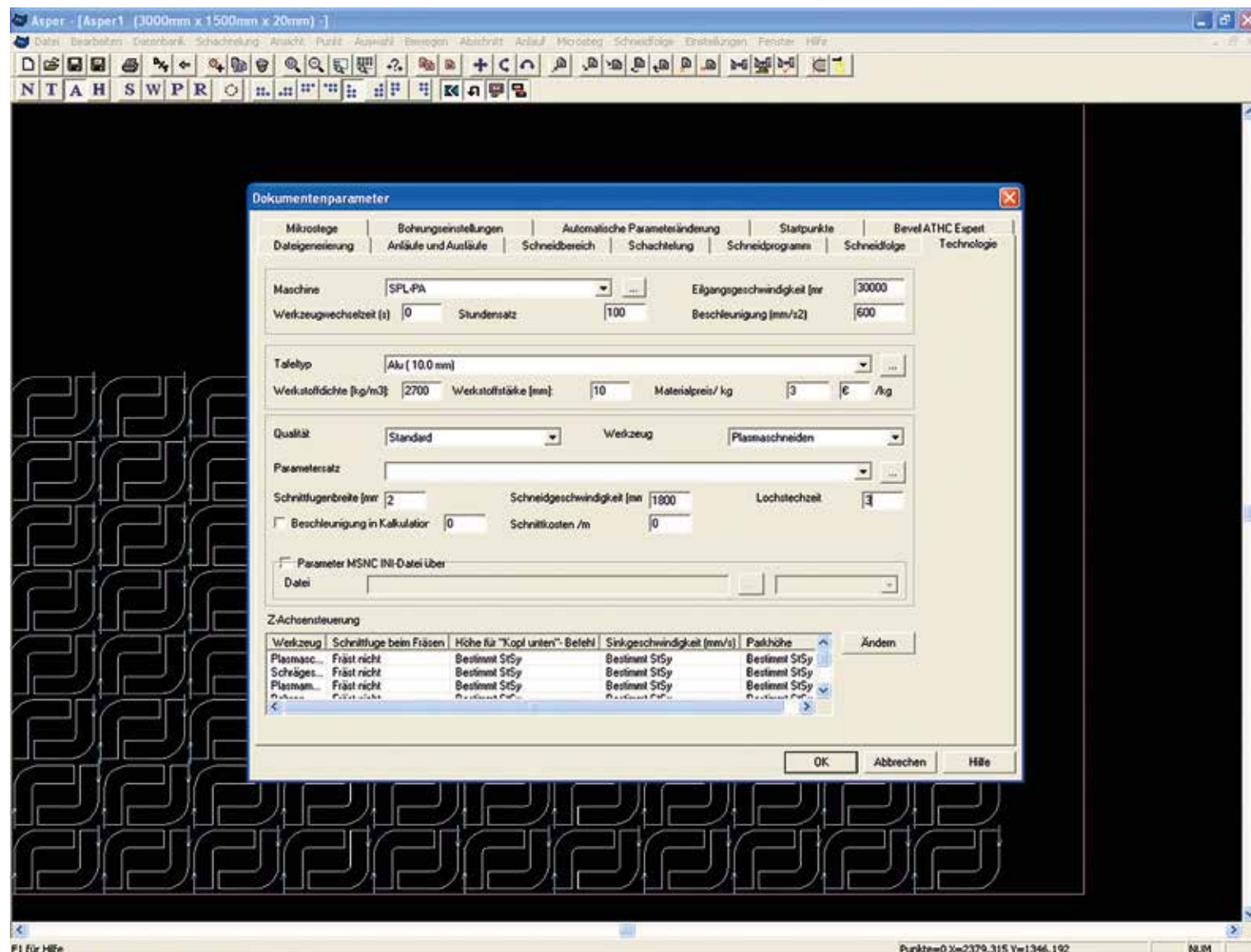
**Snapshot** – immediate saving of the actual machine state – all parameters including the executed cutting plan can be stored for a

later analysis – without interruption of the machine operation.





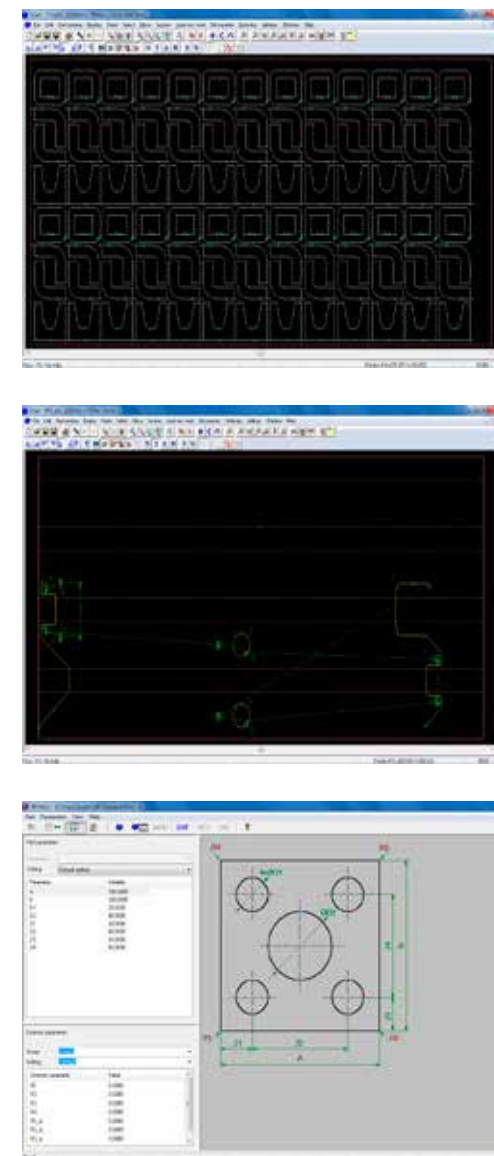
# AsperWin® 4.0 Integrated with MPM



MicroStep's CAM software AsperWin® is the result of 15+ years of intense development and continuous customer driven improvement in the area of software applications for CNC machinery. It unifies the practical programming experience with long-term user know-how and an intuitive, transparent way of operation.

AsperWin® provides tools for easy and fast creation of NC programs for different cutting technologies. The basic pack dedicated to straight cutting can be extended by a variety of specialized modules designed for particular cutting applications (e.g. bevel cutting, pipe cutting, multi-torch cutting) and eventually fitted to customer's special requests. With its transpar-

ent menu structure and enhanced functions AsperWin® represents a modern and powerful tool for NC programming. For enhanced flexibility it is possible to get AsperWin® with a network license.



## AsperWin® Basic

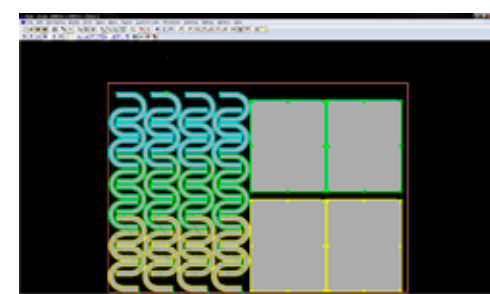
AsperWin® Basic is the essential CAM module of MicroStep machines. It imports drawings of parts in DXF and other formats and provides interactive functionality and automatic generation of NC code.

## AsperWin® Basic Net

AsperWin® Network license allows installing AsperWin® on a network drive to enable access from several workstations. License is herewith not limited to just one user or one computer while the cost is significantly reduced.

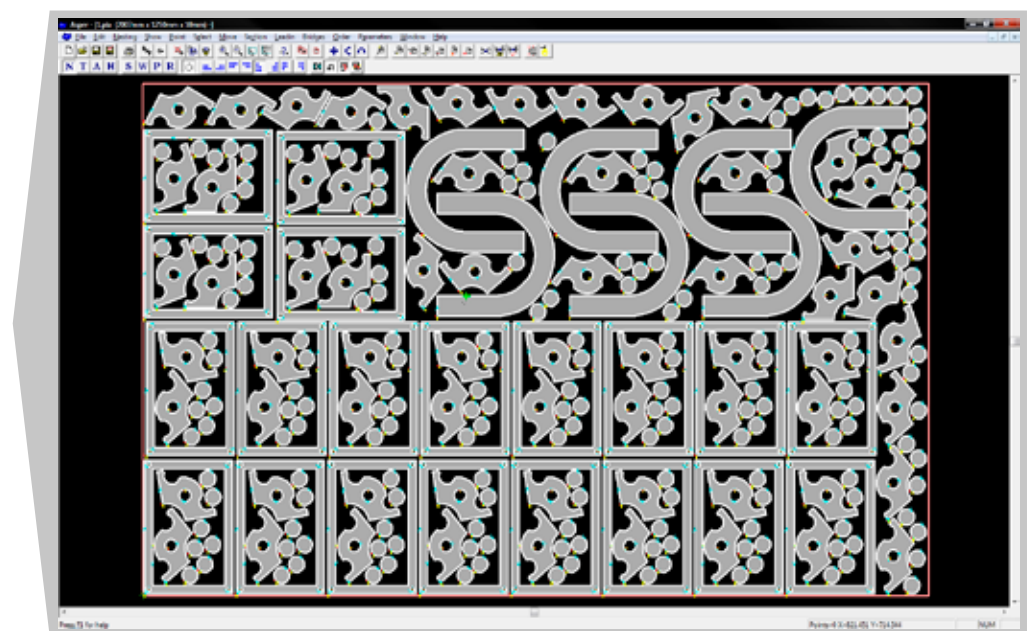
## Multi-torch cutting

The multi-torch cutting module enables to perform simultaneous cuts with several torches with possibilities of parallel, tapered as well as non-parallel tapered cutting (in case of long trapeziums).



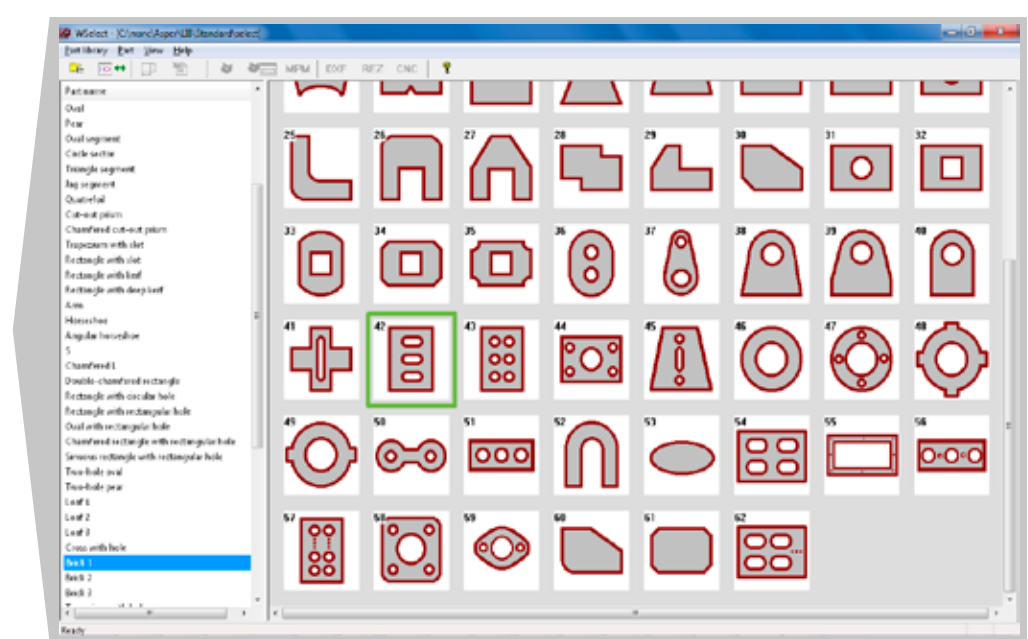
## Automatic nesting

Automatic nesting module enables effective creation of nests with a big number of different cut parts to achieve the best possible utilization of material with minimum waste. The module uses several geometrical nesting methods and has the ability to process separate part groups on defined areas of a plate as well as whole sheets while respecting defined criteria like material properties or information from database system.



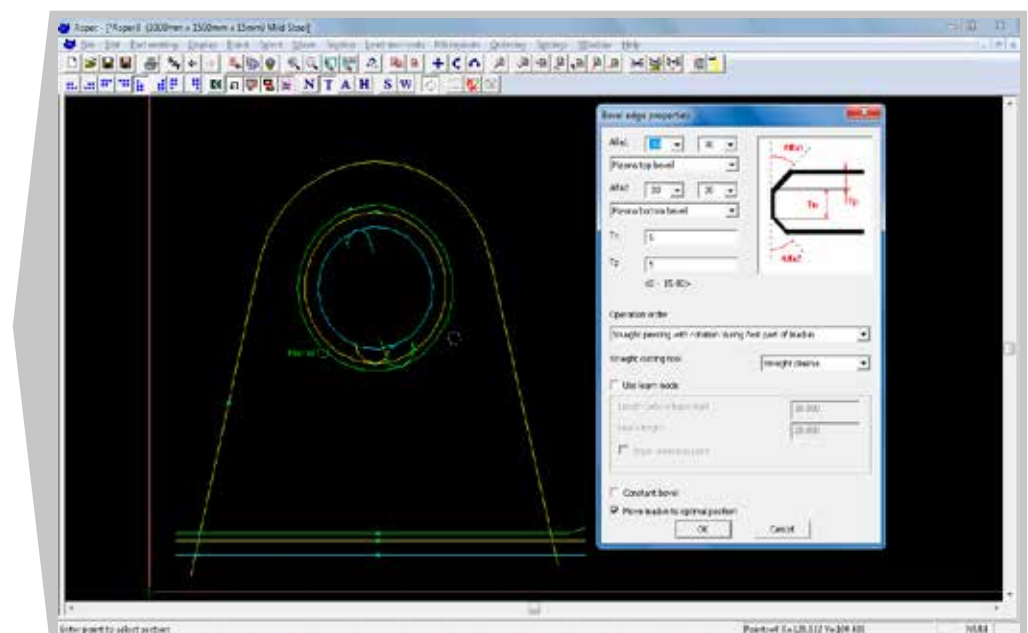
## WSelect

AsperWin's default macro library WSelect contains an extensive collection of macros of adjustable standard shapes that can be exported to DXF or loaded directly into Asper for processing. WSelect offers most of commonly used components from simple geometrical shapes to complicated flanges. Each macro can be saved in as many configurations as required for later quick import into CAM, without using a CAD program. MicroStep is able to supply specific macros on customers' demand.



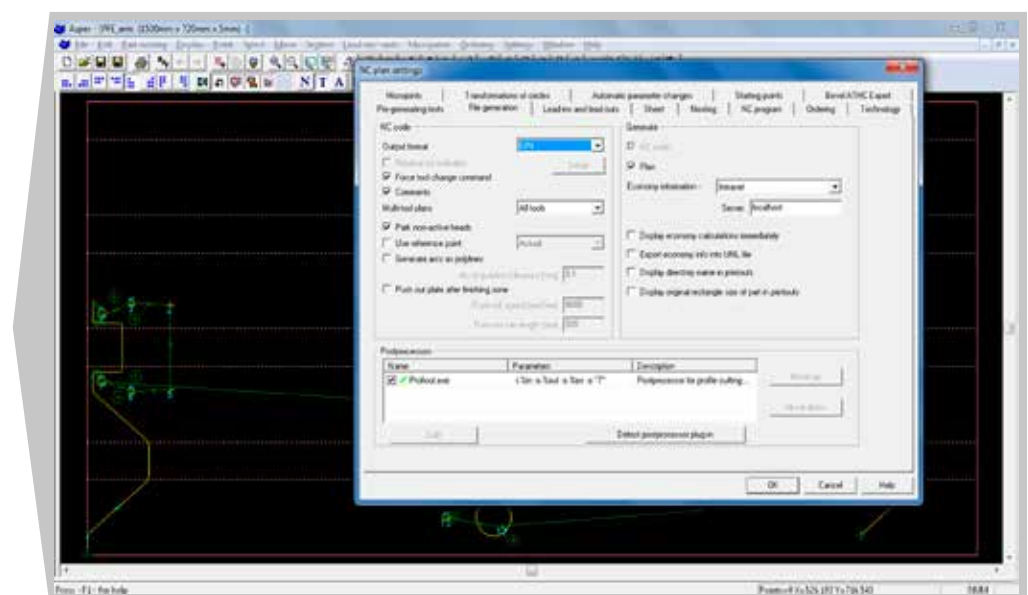
## Bevel cutting

Bevel cutting module is used with bevelling tool stations that can move in 5 axes: X, Y, Z, A (torch tilt up to 50°) and B (endless rotation). The module supports 3 methods of starting a bevelled cut: piercing at an angle, tilting the torch after piercing at the piercing point or within the lead-in. It supports various torch height control methods for individual parts or a group of parts according to their size and shape. Y-cuts and variable bevels are also supported.



## Profile cutting module

Profile cutting module is dedicated to cutting of polygonal profiles. It generates programs for cutting various shaped openings into the profile walls, division of profiles and cutting of openings over the edge by means of a tilting tool station (profile is static) or a rotator in combination with a pipe cutting device. For certain profiles, MicroStep's pipe cutting device is able to achieve necessary dynamics so that a rectangular profile can be cut over the edge by using a straight head.







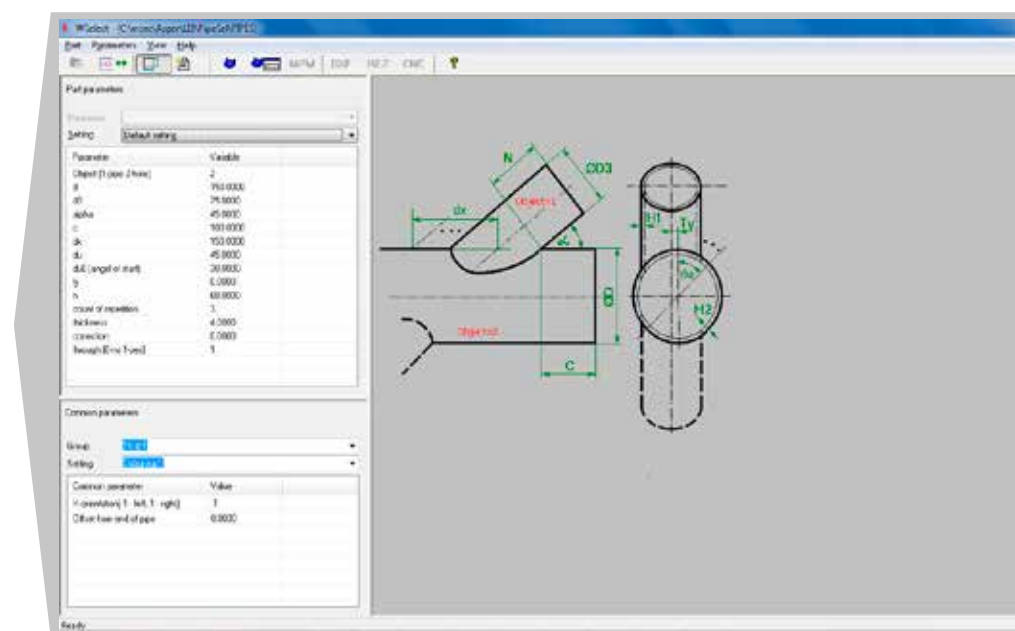
# MicroStep's CAM macro libraries

## Libraries for straight tool stations

- They can be used on machines equipped with straight tool stations
- Cuts on thick plates sometimes need further processing
- Output code has to be further processed by AsperWin

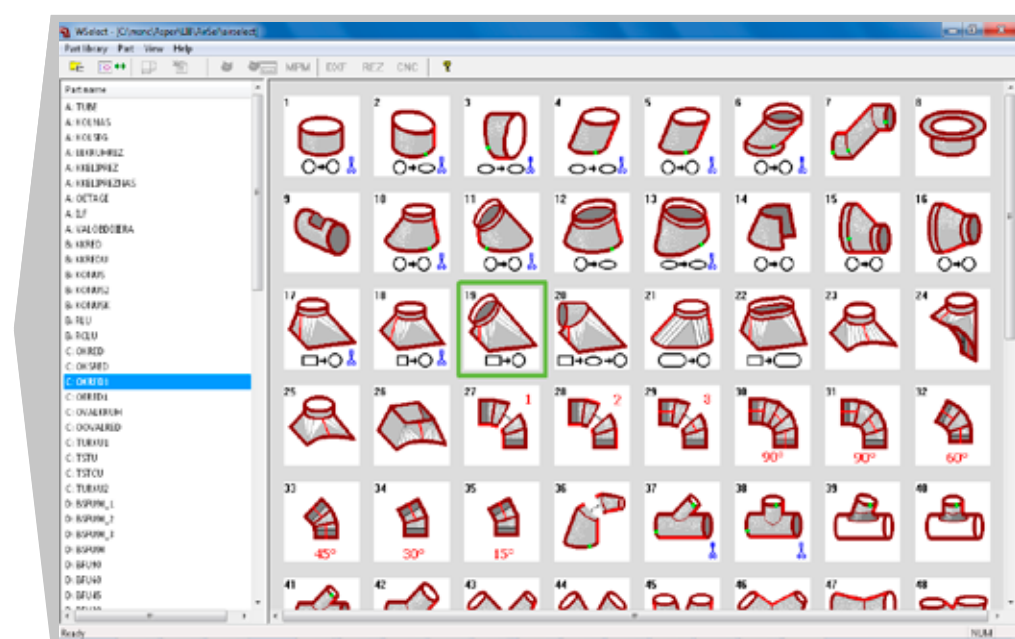
### PipeSel

*PipeSel* is a library based application for fast programming of pipe cuts, pipe intersections and transitions developed for machines with straight head and a rotary pipe positioner. It enables creating of repeated intersections of circular pipes or circular pipes and oval pipes, rectangular profiles, spheres and pipe crossings whereby also programs for branches of several pipes are created automatically. Axis of the intersecting object can be as well shifted against the axis of the main pipe.



### AirSelect

Software module *AirSelect* for duct-work manufacturers enables fast and comfortable design of HVAC (heating, ventilation, and air conditioning) components. The extensive library contains adjustable shapes of a variety of commonly used parts in the HVAC industry. Besides basic shapes of rectangular and round fittings the library also contains pipe elbows, symmetric and asymmetric toes, offsets etc. Rectangular sectional parts are compliant with DIN 18379.

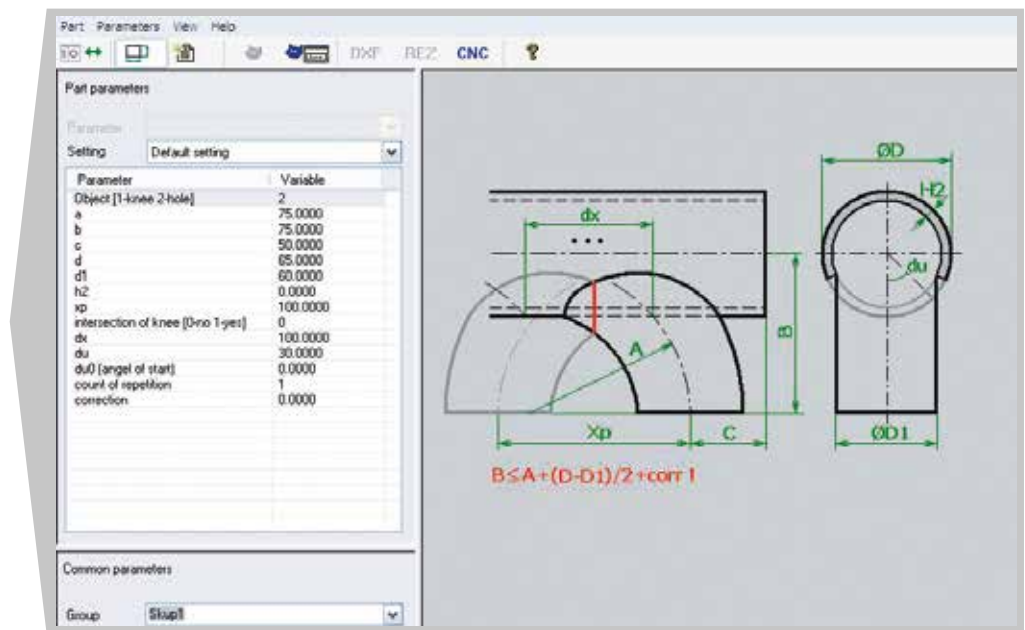


## Libraries for bevelling tool stations

- For creation of cutting plans using 3D cutting contours
- Resulting cuts seldom need further processing
- They generate CNC output code

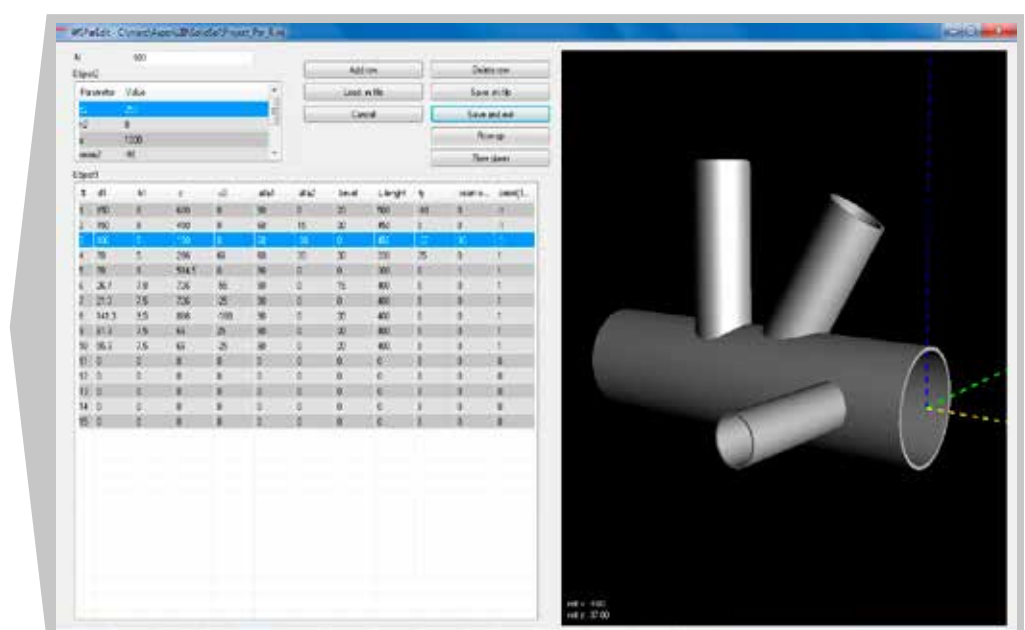
### ElbowSel

*ElbowSel* is a library based application for creation of cutting programs for connections of elbows and pipes in pipeline constructions. The cutting is achieved thanks to MicroStep's unique elbow clamping adapter which enables clamping of the elbow in a rotary pipe cutting device and rotation of the elbow around the device axis. Thanks to this smart construction, the elbow end can be precisely cut also by using a straight tool station. A connection of 2 elbows with a pipe in 1 spot is also supported.



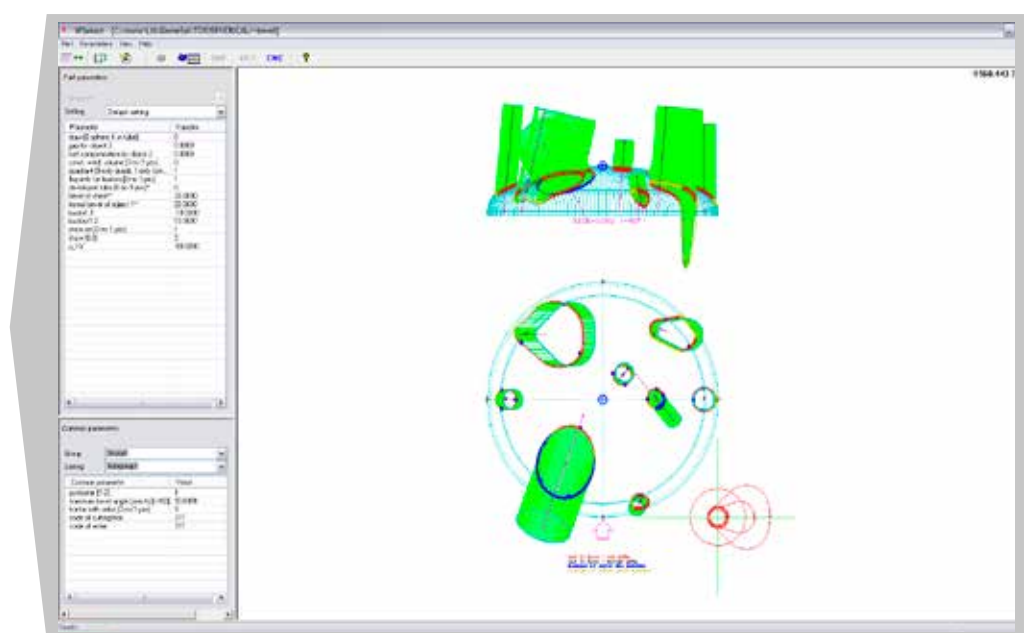
### SolidSel

The bevel pipe cutting library *SolidSel* provides the full range of pipe based solutions on machines equipped with a pipe cutting device (RSV) and a plasma rotator. The extensive library enables creation of precise multiple intersections of pipes and domes, pipe cross beams and marking of synchronization lines and theoretical outlines when a bevel above 45° (50°) is required. It enables creation of constant welding volume cuts for welding machines as well as cutting of sheets for later bending into pipes.



### DomeSel

*DomeSel* provides extended possibilities for processing of domes on machines equipped with a plasma or oxy-fuel rotator and a dome cutting zone. It offers convenient creation of precise multiple intersections of domes with pipes, creation of bevelled welding volumes in domes, creation of diverse cut-outs as well as complete dividing of domes. The library contains several modules with fully adjustable macros for easy and fast preparation of cutting plans in compliance with DIN 28011 and DIN 28013.



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# **MicroStep<sup>®</sup>** **NEWS**

spol. s r.o.

## mCAM

CAM solution for 3D cutting

## MPM

Efficiency for your production

## ProfileCut

Versatility in structural jobs

