www.microstep.eu | 2017

MicroStep® NEWS

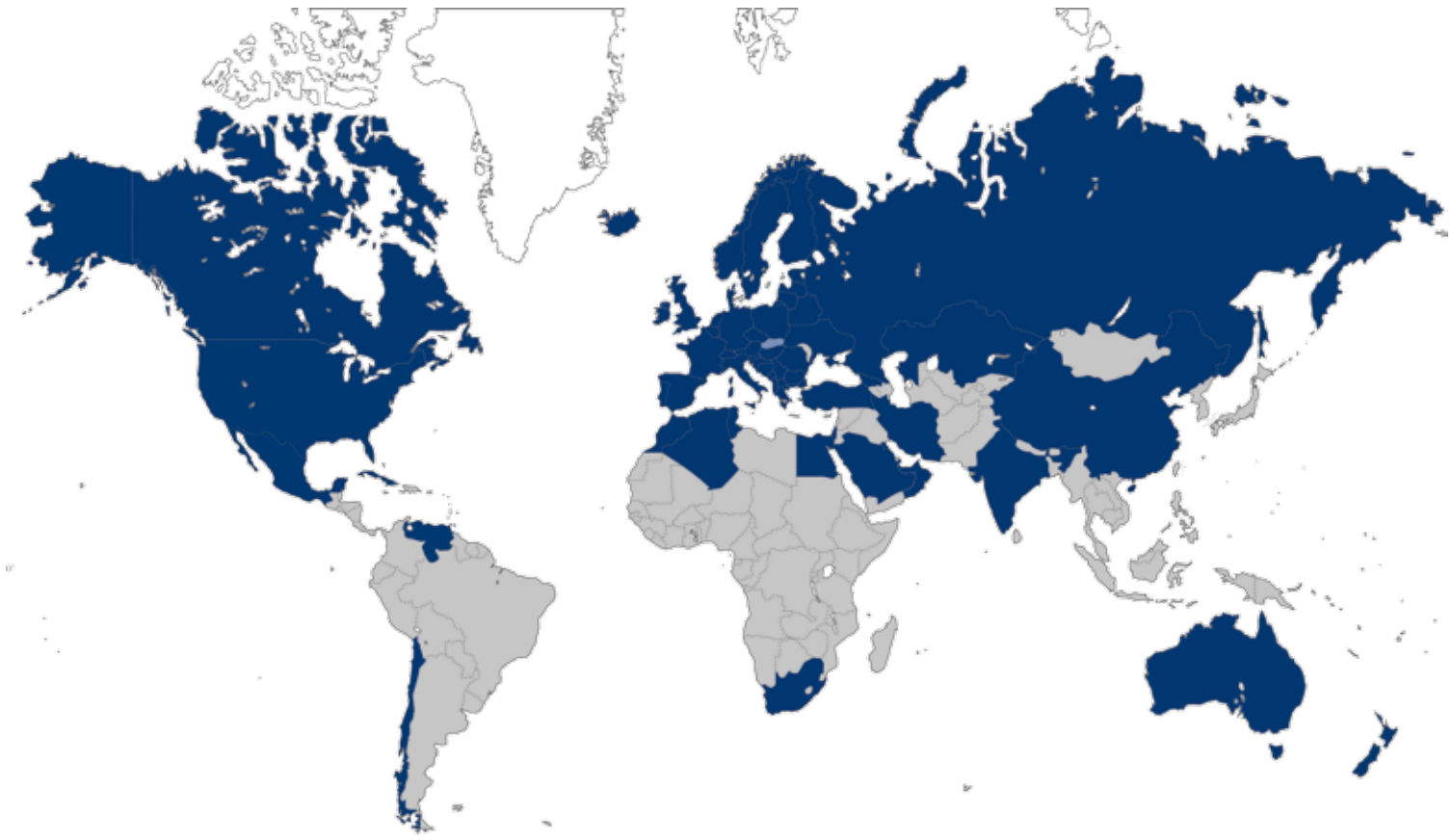
ABP
Accurate weld preparation

iMSNC
The ultimate 24” control GUI

MSF
Fiber laser bevel

MicroStep World

MicroStep, 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!



Smart machinery for Smart Industry / Introduction

Ing. Alexander Varga, PhD.
General manager

In its 25 years of history MicroStep has supplied more than 2,200 cutting machines worldwide in co-operation with long-time channel partners spread over 53 countries. The focus of our company are hi-tech machines that accommodate industry´s latest trends – delivery of fully automatic cutting cells that combine different cutting/drilling/marking technologies in connection with automatic loading and unloading systems, all of which are customized for the particular manufacturing need. As a company with automation background we have been following demands for higher level of machinery automation, interconnection of control systems, CAM software and ERP systems for years. Our in-house developed solutions of machine-to-machine and machine-to-enterprise communication have found their applications in several enterprises in Europe and Asia. Digital transformation of manufacturing processes in line with the initiatives of Smart Industry and Industry 4.0 present us with a welcome challenge.

Today, MicroStep offers the full range of contemporary cutting technologies – plasma, laser, oxyfuel, waterjet – along with a great variety of supplemental solutions – equipment and software for drilling, tapping and countersinking, marking, as well as process synchronization, automated material handling and robotic solutions. We have developed different types of bevel tool stations for cutting of sheets, pipes and 3D objects – domes, HSS and IPE profiles or elbows. Our recent launch is mSCAN – a devoted point cloud processing software used in an advanced 3D laser scanning process to map real shapes of 3D objects, e.g. domes, resulting in higher precision and quality of the following cutting process. Substantial development was also made in the field of fiber laser applications: introduction of the bevel head and pipe/profile cutting options. In addition to our own R&D we work closely with departments of the Slovak University of Technology in Bratislava.

Our company continues to grow: in autumn 2015, our subsidiary MicroStep Europa GmbH opened new premises and a technological centre in Bavaria, Germany. In 2016, new subsidiaries of MicroStep were established in North America – MicroStep USA and MicroStep Canada. We gladly welcome the new members in our family.

Our goal is to provide solutions that improve everyday work in factories – they assure higher precision, minimize downtimes, enable more convenient and more effective operation and easier maintenance. Our priority is to help our customers embrace the newest trends in manufacturing – IIoT, Smart Industry and Industry 4.0.

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ABP: Weld edge preparation on pre-cut parts

Since the introduction of our plasma rotator MicroStep has been making continuous development in the field of bevel cutting technology – improvements of mechanics and motion control went hand in hand with the development of plasma sources and implementation of latest cutting technologies which resulted in the unique features of the current version:

- Endless tool rotation with a fixed tool center point
- Arc voltage height control during cutting (ATHC)
- ITH torch holder with a slip-back function and an advanced sensor system for material position detection
- Self-teaching auto-calibration system of tool geometry (ACTG) which significantly improves long-term accuracy and reduces maintenance time
- Initial height sensing via electric contact in the plasma torch
- Adaptive bevel compensation (ABC)

Now we introduce our latest innovation – the Additional beveling process (ABP) that enables the creation of bevels on vertically pre-cut parts.

After loading an original 2D part drawing into AsperWin®, the user simply defines the desired bevels and the system will generate a cutting plan for ABP. To find the exact location and position of the straight-cut part on the cutting table, the machine uses a laser line ABP scanner. During scanning it compares the ideal shape (drawing) and real contour of the part and after verification of the starting point it will cut the additional bevels. To ensure the accuracy of the system in long-term use, ACTG station is used for scanner calibration as well.

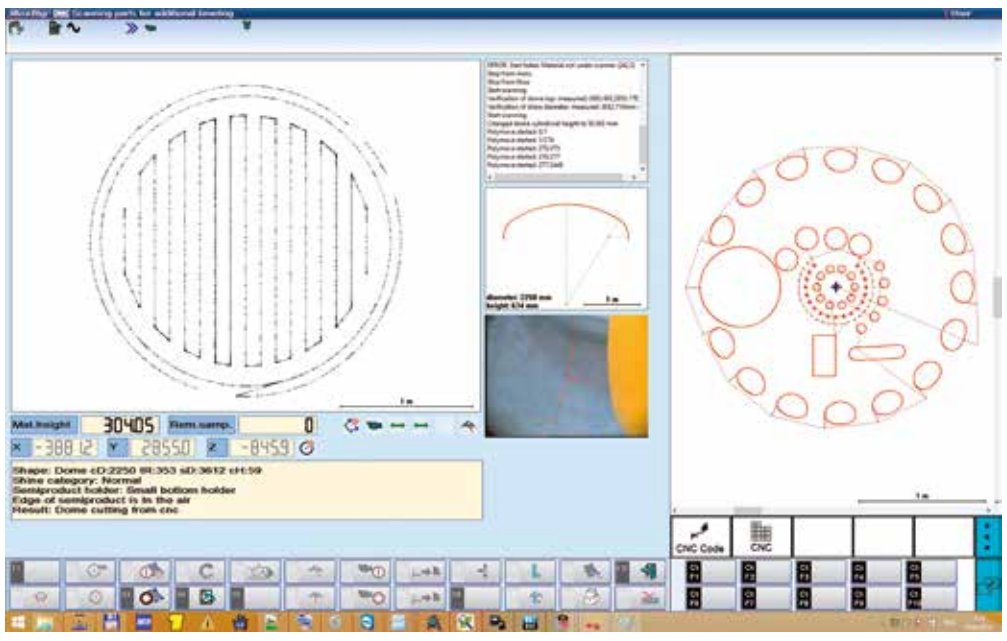
Dome cutting expert

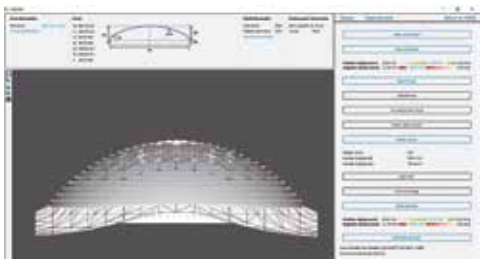
True surface representation with mSCAN

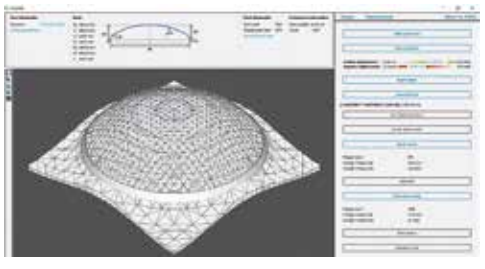
Production of pressure vessels and boilers counts among the major industrial applications where cutting of 3D objects comprises an essential part of the production process. The obvious requirement is to make this process fast, simple to setup and, most importantly, with an accurate result that won´t need further mechanical or even manual processing. Typical cutting tasks in this regard are cutting of openings in a dished end of a vessel for welding of inlet pipes, slicing of a dished end or trimming of the edges of a dished end with preparation for its welding to the vessel body. The cross-sections of the cut edges must meet the requirements of the subsequent welding process – in other words, depending on the wall thickness of the cut object, the V-, X- or K-cuts with constant or variable bevels need to be produced with the prescribed accuracy, preferably in a fully automatic process.

For such tasks MicroStep has developed a special beveling tool station that enables tool tilting up to 120° while having a big enough stroke to reach across the whole dome surface. Furthermore, MicroStep has newly introduced an advanced 3D laser scanning process and a corresponding point cloud mapping software – mSCAN – that enables a CNC cutting machine to measure the true shape of a 3D object, e.g. a dome, and use this measurement for adjustment of the subsequent cutting process so that contours and openings are cut in the needed positions on the surface with a very high precision – compliant with the production requirement.

Needless to say, implementation of such 3D scanning technology greatly contributes to increasing of the accuracy of the dome cutting process, as the real dimension of a dome can lay within – at least – allowed tolerances which in fact means that the real and ideal shapes of domes sometimes differ by several centimeters. Conventional methods of positioning corrections via control of plasma arc voltage are thus not applicable in case of 3D cutting. Implementation of a scanner on the other hand makes it possible to create a model of the actual dome surface within the coordinate system of the cutting machine and to subsequently use this model to analyze the shape of the dome, identify its center and define the exact toolpath above the surface. How does it work?

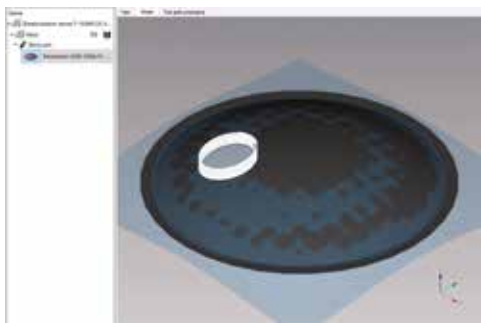


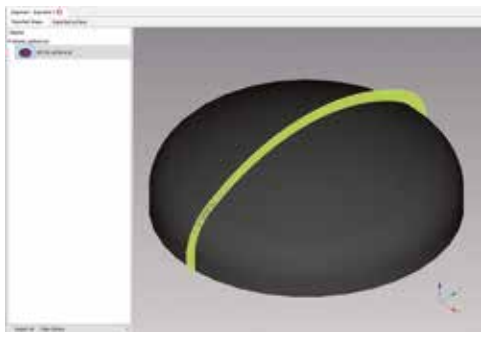




During the scanning process, the iMSNC control system receives data from the scanner and pairs it with positions of all motion axes of the machine in each moment. The measured positions are further adjusted by applying displacement corrections of particular axes positions (based on the exact measurement of machine kinematics by a laser interferometer) as well as the calibration data of the bevel head and 3D scanner itself (obtained via MicroStep´s patented auto-calibration technology ACTG). As a result, the control system has information about the exact position of the scanned object with respect to the cutting tool and thus enables exact scanning of this object within the coordinate system of the particular cutting machine. The scanner then uses mSCAN to create a surface representation of the object in form of a point cloud. mSCAN uses various shape calculations that fully describe parameters of the scanned dome and identifies manufacturing imperfections and deviations from an ideal 3D model. A digital representation of the real surface is then created based on these information and is used to adjust all of the cutting paths originally generated for an ideal shape to the actual scanned surface. Depending on the dome size, this whole process, which is carried out prior to the actual cutting, takes from 2 to 10 minutes.

Of course, there are cases where it isn´t necessary to perform the whole process and thus the time is significantly decreased. In case the customer needs to measure just the dimensions of dome, it is enough to scan a "cross" projected over the top of dome – this way, also the exact position of the dome top is determined, which may be important for the next production steps. The top of the dome can be marked with a marking head or directly with a plasma





torch, depending on the particular configuration of the machine. Also, if the cutting plan involves just a part of the dome surface, e.g. the spherical top part that is usually quite flat, it is not necessary to scan the whole dome extensively. In case of cutting into the more flat top part the height control during cutting can be based on plasma arc voltage which is a standard function of any MicroStep plasma cutting machine.

All processes and 3D scanning functions are handled by the machine operator or easily accessed via a company network. Additionally, mSCAN provides an analysis of shape geometry – a comparison of the true and ideal shapes of the scanned object which in itself is a powerful tool for verification of production output in production of 3D objects, e.g. domes. Thanks to the modular structure of MicroStep machines in terms of machine dimensions, types and locations of cutting zones and configurations of tool stations, a particular machine can be designed according to exact requirements of a customer´s production. A single gantry with a bevel tool station, 3D scanner and marker can be used for cutting of domes as well as flat sheets – an example is the DRM machine for Slawinski GmbH in Germany with a flat-bed cutting of sheets on the area of 14 x 6 m and dome cutting in the range of Ø 500 – 5,500 mm with a dome height up to 1,200 mm.

DRM 21001.60 PpkSM
www.slawinski.de

Slawinski GmbH & Co. / Germany

Slawinski GmbH & Co. has been a recognized manufacturer of tailored heads and bottoms for vessel and apparatus and system constructor since 1914. From Siegen in the middle of Germany, it supplies customer right across Europe – from very small companies to global players. For that Slawinski relies on innovative technology: to achieve most accurate results MicroStep developed in 2016 a new system to process domes with extraordinary extents.

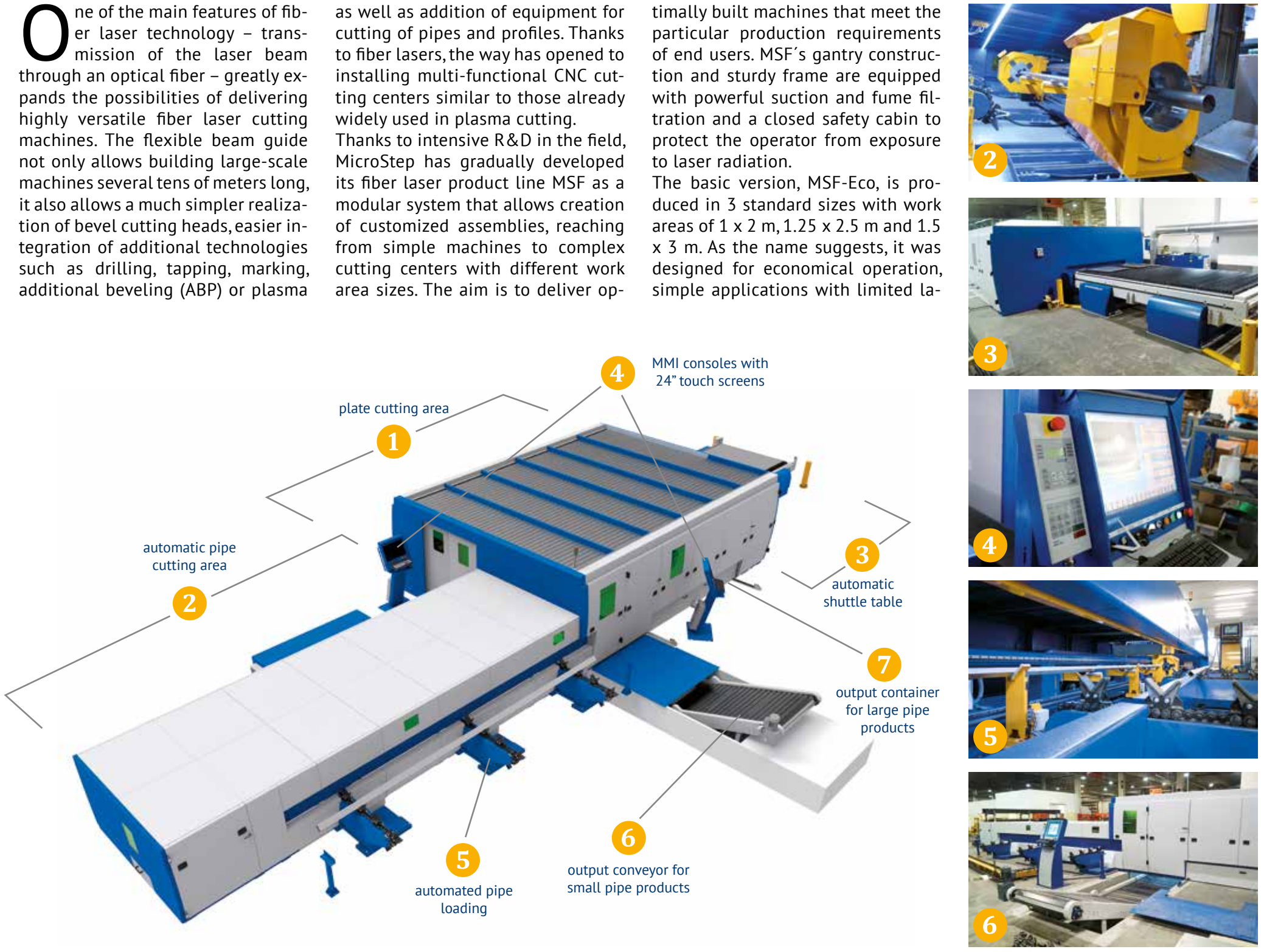

1

MSF: Modular design brings great utilization of fiber laser

One of the main features of fiber laser technology – transmission of the laser beam through an optical fiber – greatly expands the possibilities of delivering highly versatile fiber laser cutting machines. The flexible beam guide not only allows building large-scale machines several tens of meters long, it also allows a much simpler realization of bevel cutting heads, easier integration of additional technologies such as drilling, tapping, marking, additional beveling (ABP) or plasma as well as addition of equipment for cutting of pipes and profiles. Thanks to fiber lasers, the way has opened to installing multi-functional CNC cutting centers similar to those already widely used in plasma cutting.

Thanks to intensive R&D in the field, MicroStep has gradually developed its fiber laser product line MSF as a modular system that allows creation of customized assemblies, reaching from simple machines to complex cutting centers with different work area sizes. The aim is to deliver optimally built machines that meet the particular production requirements of end users. MSF´s gantry construction and sturdy frame are equipped with powerful suction and fume filtration and a closed safety cabin to protect the operator from exposure to laser radiation.

The basic version, MSF-Eco, is produced in 3 standard sizes with work areas of 1 x 2 m, 1.25 x 2.5 m and 1.5 x 3 m. As the name suggests, it was designed for economical operation, simple applications with limited la-



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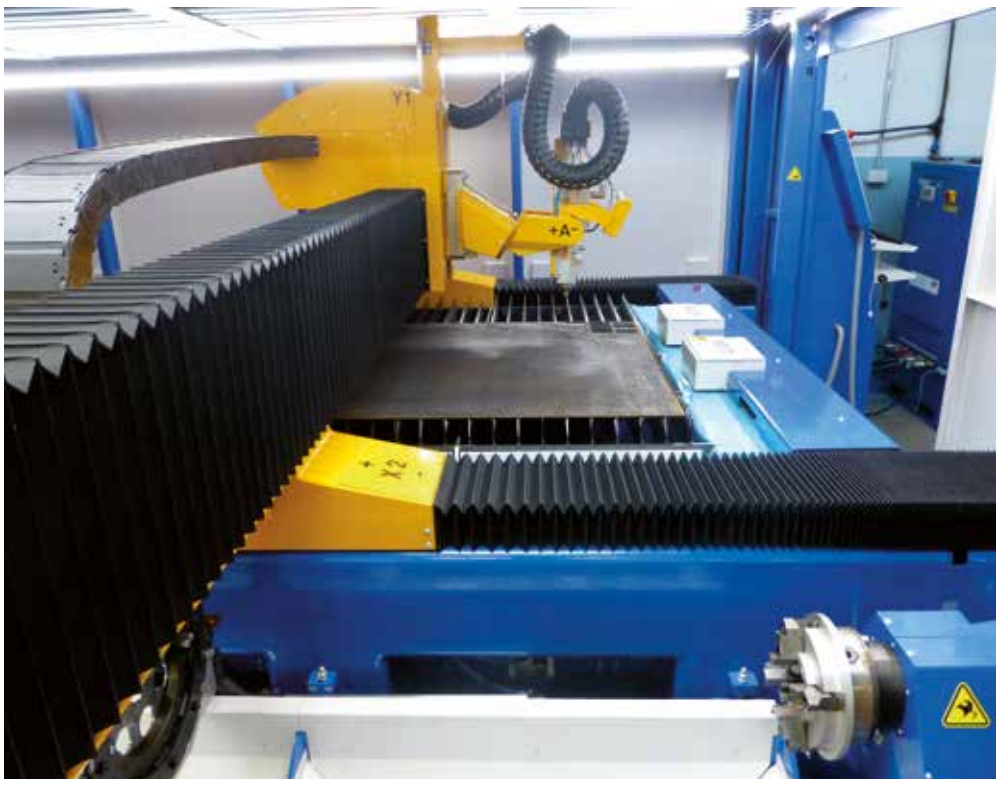
ser power. It is supplied with a simple cutting grate that can be manually slid out of the work area to the front of the protective cabin for more convenient loading of semi-products and unloading of cut parts. The standard version, MSF, is delivered in sizes from 3 x 1.5 m up to 12 x 3 m. These standard machines are equipped with an automatic shuttle table with two cutting grates that enable simultaneous operations of cutting and loading/unloading. Waste collection and disposal is provided by a belt conveyor and a waste container positioned below the work area of the machine. The machine has an automatic lubrication system that reduces and simplifies the process of its regular maintenance.

The standard MSF machine can have cutting heads for straight or bevel cutting, with a maximum bevel angle 45°. Control of the cutting height is in both cases provided by a capacitive sensor integrated in the cutting head that automatically measures the distance between the cutting tool and the cut material. For proper function of the measuring system, it is necessary to keep the cutting nozzle undamaged and clean. For this purpose, the machine is equipped with a combined LU3K station – an automatic station for cleaning of the nozzle, optical check of its status, and automatic calibration of the height sensor. For bevel cutting heads, calibration of the height sensor is carried out automatically for the whole range of tilt angles.



When equipped with a bevel cutting head, MicroStep´s patented auto-calibration system ACTG ensures accurate compensation of potential mechanical inaccuracies that may occur in the geometry of the bevel head during long-term use. ACTG greatly contributes to long-term stability of bevel cutting process.

Furthermore, the standard version of MSF machines can be enhanced with a supplementary zone for cutting of pipes and hollow profiles of different cross-sections. MicroStep offers three alternatives of this technology. The first two enable cutting of pipes with diameters up to Ø 200 mm and Ø 300 mm. For closed profiles, these values represent the maximum diameter of circles circumscribing their cross-sections. The pipe cutting part of the machine is placed along the X axis. Material handling is conveniently ensured by a sliding side panel of the safety cabin.

In addition to these two options, MSF can be equipped with a fully automatic pipe cutting system that allows cutting of pipes and rectangular profiles with diameters up to Ø 200 mm, with a transversal loading conveyor on the input, automatic feeding of the pipes into the cutting area by a moveable chuck, and a transversal output conveyor for small parts as well as a collecting tray for bigger parts on the output.

The modular design of MSF provides a wide range of cutting machine configuration options. The customer gets the possibility to configure his laser system exactly according to his needs and to integrate it most effectively into his production workflow. Thanks to the modularity, various levels of automation of material flow are possible – in addition to pipe-cutting automation, an automatic loading system for sheet metal, VCM, can also be supplied.

Masters of metal work

MG 7501.20 PrkGB | MSF 4001.20 L + T200AF + MT | MSF 3001.15 L
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BUMET specializes in development, production and assembly of sheet metal components, complete metal structures and metal tooling. The company is renowned for its comprehensive knowledge of sheet metal work, long experience working metal and extensive involvement in the development of metal products. Flexibility, quality and trustworthiness are BUMET's watchwords. BUMET's sheet metal products can be found in many sectors – automotive, medical, agricultural and food industry, heater and machine construction etc.

3D solutions for steel constructions

Automated cutting machines for structural steel jobs

Apart 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 sheets and an extracted channel for pipe positioning that is placed along the longitudinal side of table. The pipes are clamped in a rotary pipe cutting device located at the one end of the channel. The cutting process involves a combination of movements: the gantry with tool stations – straight or bevel – 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.

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 processed material or the requirements for automation of material input and/or part output, and alternatively 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, which means that they are configured for particular requirements of customer's production. PipeCut machines can have a working length of 3 m, 6 m or 12 m and can process pipes with diameter ranges Ø 50 mm to Ø 800 mm. The maximum wall thickness is 50 mm for plasma cutting and up to 100 mm for oxyfuel. CPCut machines can process also

large-sized pipes with diameters of up to Ø 3,000 mm.
For cutting of open sections, such as I, H, U or L profiles, MicroStep introduced a concept with a 3D kinematic system that is positioning the cutting torch above the surface of a steady profile – this machine line is supplied under the name ProfileCut. During the cutting process, the cut profile is motionless while a specialized 3D cutting head with tilting ability of 120° moves around the profile both in the longitudinal and transverse directions. Furthermore, the abilities of ProfileCut can be enhanced by adding a drilling/tapping/countersinking tool station with automatic tool exchange for drilling up to Ø 40 mm or by various marking tool stations. The precision of cutting and positioning of the tool above the actual profile is achieved by an advanced system of 3D scanning of profile shape with laser line scanner, followed by automatic adjustment of cutting program as well as adjustment of machine movements according to the true shape of material.
In addition to cutting of open profiles,

ProfileCut machines can be equipped also with other cutting zones, e.g. for processing of hollow profiles (cutting by means of a pipe positioner like on a PipeCut machine) or a cutting table for sheet cutting like on a standard flat-bed machine – all by using the same gantry and tool stations. This concept makes the ProfileCut one of the most versatile cutting solutions for steel constructions on the market.

For requirements of automation of the cutting process with automatic loading and unloading of material – no matter if sheets, hollow sections or open profiles – MicroStep offers enhanced versions of its machines with input and output conveyors in which the material is inserted into the working area on a roller track by special gripper arms. Such automated lines equipped with automatic

measurement of the thickness and dimensions of material offer further possibilities of automation in interconnection with information systems or production management applications like MicroStep´s MPM.

ProfileCut 12001.15 SPpk + AF + MT

Hongxun Elevator Accessories Group / China

HEM (Hongxun Elevator Accessories Group) owns 4 production centers and has more than 1 100 employees. The enterprise is high-technology oriented and keen to invest in advanced equipment. The company was founded in 1979 and over time became a strong supplier of many famous elevator companies, such as HITACHI, OTIS, FUJI and others.

5

Industry-proven beveling solutions

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. Thanks to our long-term focus and experience we were able to continuously innovate the equipment and, furthermore, develop new technologies that secured MicroStep a 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 beveled 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 still a relatively low awareness of decision makers in engineering companies about the possibilities, availability and reliability of contemporary beveling 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 beveled 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.

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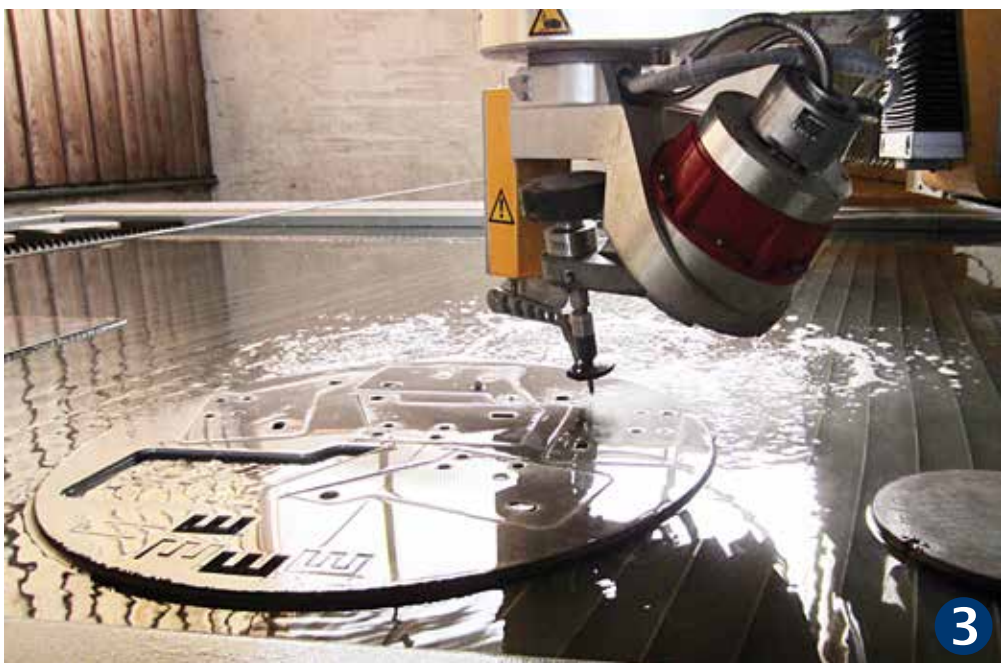

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Our comprehensive beveling function and supporting functions such as torch geometry calibration and adaptive bevel compensation allow our customers to cut bevels in a convenient way using different cutting technologies and their combinations – plasma, laser, 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 provide two types of beveling processes:

DBP – Direct beveling 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.


4

ABP – Additional beveling 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 DBP 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


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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.


9

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 450 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.


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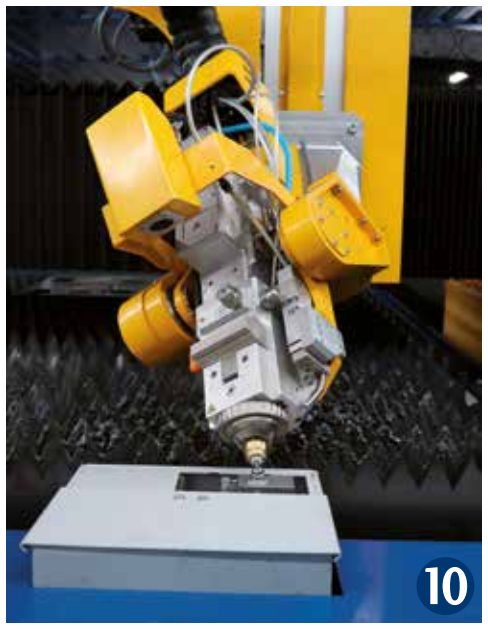
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13

Real shapes of the cutting slots for V-cut and A-cut at bevel angles 0°, 15°, 20°, 25°, 30°, 35°, 40° and 45°

12

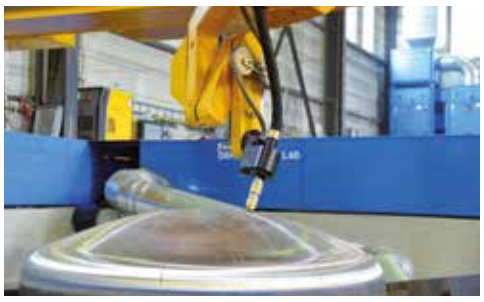
Accessories of MicroStep machines

Plasma / 3D tilting

Plasma tool station incl. anti-collision protection, laser pointer, arc-voltage THC and full support of plasma marking. 3D tilting tool station with a tilting ability up to 50° allows to perform a great portion of common bevel cutting jobs.

Rotator

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



3D rotator 120°

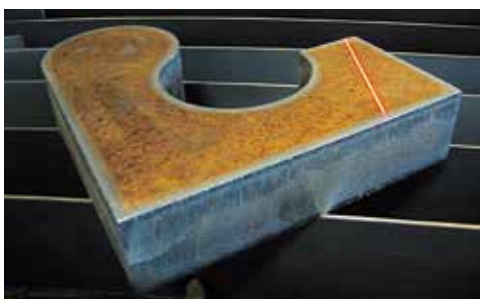
5-axis 3D rotator 120° with a tilt range up to 120° and 1.5 m stroke enables cutting of 3D shapes such as open profiles I, H, U or L and domes.

ACTG / ACDB

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

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 ±45°. Fully automatic gas console with preset parameters ensures stable quality of cuts and best efficiency. Multi-tool version enables stripe cutting with stripe width ⩾ 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° – 50°. 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.

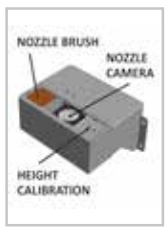
Waterjet rotator

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

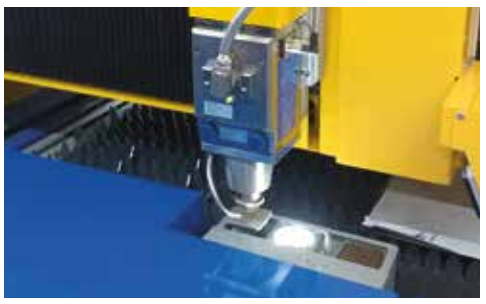
Laser / Laser rotator

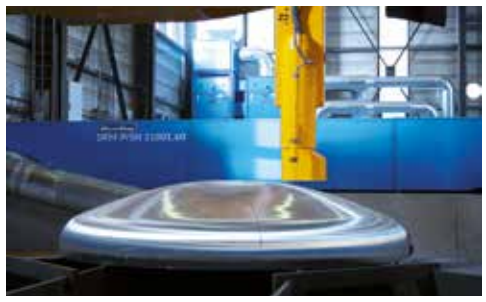
Laser tool station for fiber laser cutting of various types of materials. Bevel tool station enables bevel cutting up to 45°.

Nozzle calibration

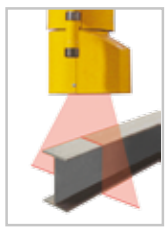


A combined station provides automatic calibration of capacitive height sensor in the laser head, brush cleaning of laser nozzle from possible spatters after fast piercing and camera check of the status of nozzle orifice.



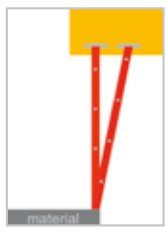


3D scanner

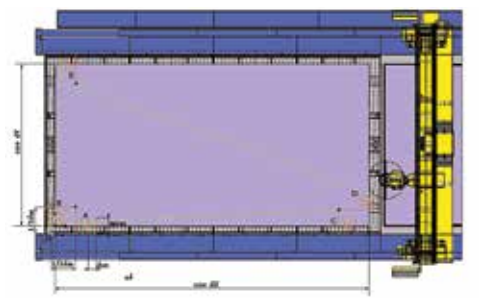


Laser scanner with rotation and tilting ability allows to create detailed surface representations of scanned objects – e.g. profiles and domes. In combination with mSCAN application it allows to adjust cutting plans according to true shape of 3D objects.

CCD camera / Automatic plate alignment



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
A laser sensor is used for scanning of plate edges for auto-alignment with the coordinate system.

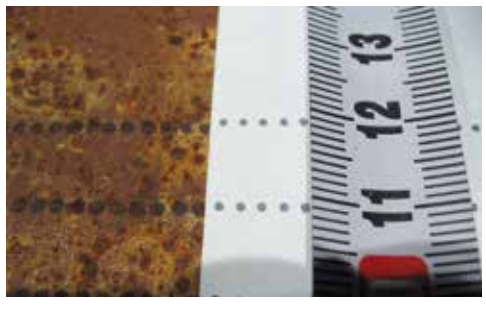


Drilling & tapping

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 multipurpose waterproof marking in industrial environment. It can write lines, characters, barcodes or 2D matrix. The marking speed reaches a notable 20 m/min.

MicroPunch / Laser marker

MicroPunch marking unit is designed for mechanical marking of sheets, pipes, profiles with differently machined surfaces.
Laser marker allows to mark text, barcodes, 2D matrix codes and bitmap images with fiber laser.

MG Multi-functional CNC 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 are suitable for a variety of applications: bevel cutting with plasma and oxyfuel, additional beveling process (ABP), pipe, profile, dome or elbow cutting, drilling with automatic tool exchange, plate positioning with laser sensor or a CCD camera, inkjet, MicroPunch or laser marking. A special heightened version of the gantry allows oxyfuel cutting up to 250 mm.


Plasma


Rotator


ACTG


ABP


Oxyfuel


Oxy triple torch


G-Multi

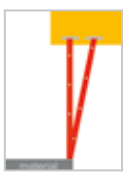

Drilling & tapping


Pipe & profile cutting


Inkjet


MicroPunch


Laser marker


Automatic plate alignment


CCD camera

BOSCH

MG 15001.35 Prk
www.bosch.de

Bosch Heating Systems LLC / Russia

Bosch Group is a leading global supplier of technology and services for Automotive Technology, Industrial Technology, Consumer Goods, and Energy and Building Technology. 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's 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).

DAMEN
DAMEN MARINE COMPONENTS

MG 18001.30 PrkI
www.damenmc.nl

Damen Marine Components / Netherlands

The core business of DMC is development, construction and supply of high-quality propeller nozzles. Many of the nozzle profiles are developed in-house and deliver higher efficiency for a wide range of ship types under numerous operation conditions. Their patented Optima line generates enormous thrust while significantly reducing sound and vibration. DMC has now developed an even more efficient and environmentally-friendly production method to produce the propeller nozzles with only a single weld seam on the inner side of the nozzle.

thyssenkrupp

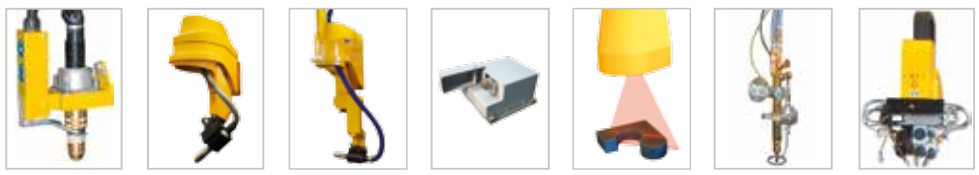
MG 24001.35 PrksPM
www.thyssenkrupp-stahlkontor.de

Thyssenkrupp Stahlkontor AG / Germany

Thyssenkrupp Stahlkontor AG offers a comprehensive range of rolling products, from slabs and cobble plates to scaffoldings and heavy plate to coils and tubes. In addition to this wide stock range the enterprise has his own processing lines on which material is leveled and cut to size according to customer specifications. It is a recognised partner to major distributors and processors in Germany and abroad.

DRM CNC sheet & dome cutting machine

DRM 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 such a automatic oxyfuel triple torches, a 120° rotator with a 1.5 m stroke of Z-axis for cutting of 3D shapes and other custom equipment. Along with the full range of sheet and pipe cutting possibilities, DRM offers special applications on domes like trimming, separation cuts, cutting of diverse openings, weld edge preparation and cutting of domes placed upside down. A 3D scanner in combination with mSCAN software allows to adjust the cutting plans according to measured true surfaces of domes and thus to achieve excellent spatial precision in 3D cutting.


Plasma

Rotator

3D rotator 120°

ACTG

ABP

Oxyfuel

Oxy tripple torch


3D scanner


G-multi

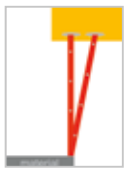

Drilling & tapping


Pipe & profile cutting


Inkjet


MicroPunch


Laser marker


Automatic plate alignment


CCD camera

LÜRSSEN

MG 51001.35 PrkI | MG 28501.35 PrkI | PLS 28501.35 PrI |
PlasmaCut 12001.30 PGI | MG 50001.35 PrkI | www.luerssen.de

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 from 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 at Lemwerder and Wolgast (Peene-Werft).

MEYER TURKU
SHIPYARD 1737

DRM 50001.80 IPrk
www.meyerturku.fi

Meyer Turku OY / Finland

Meyer Turku OY is one of the leading European shipbuilding companies. The company provides state-of-the-art technology solutions, advanced construction processes and cutting edge innovations for cruise operators and other ship owners. Meyer Turku specializes in building cruise ships, car-passenger ferries and special vessels. Over the years the shipyard has built more than 1,300 new ships for customers around the world.

Doppelmayr®

MG 15001.35 GGGG + 1.35 PcGPG | MG 13501.30 B + 1.30 WW
MG 25001.35 PracPra + 1.35 PP | MG 25001.35 P + 1.35 PP
MG 18001.30 PrkcPGG + 1.30 GGGG | www.doppelmayr.com

Doppelmayr Seilbahnen GmbH / Austria

2002 saw the merger of two leading ropeway manufacturers with a long tradition: Doppelmayr and Garaventa. This gave rise to the Doppelmayr/Garaventa Group as global competence centers for circulating ropeway systems such as gondolas and chairlifts as well as reversible aerial tramways and funicular railways. They have played a major role in technical advances and achieved many milestones which have contributed to the breathtaking pace of development in the ropeway industry.

DRM-PL Heavy-duty CNC sheet cutting machine

DRM-PL is designed to fulfil highest demands on sturdiness of machine frame for large-sized working areas. Its robust XXL gantry allows a vibration-free operation of heavy equipment like automatic oxy-fuel triple torches, various beveling tool stations, drilling units, tool stations with long Z-axes or other heavy custom equipment. Working width of DRM-PL can be more than 20 m.


Plasma


Rotator


3D rotator 120°


ACTG


ABP


Oxyfuel


Oxy tripple torch


G-Multi

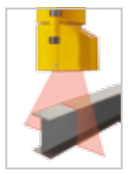

Drilling & tapping

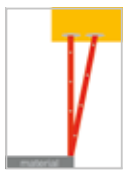

Pipe & profile cutting


Inkjet


MicroPunch


Laser marker

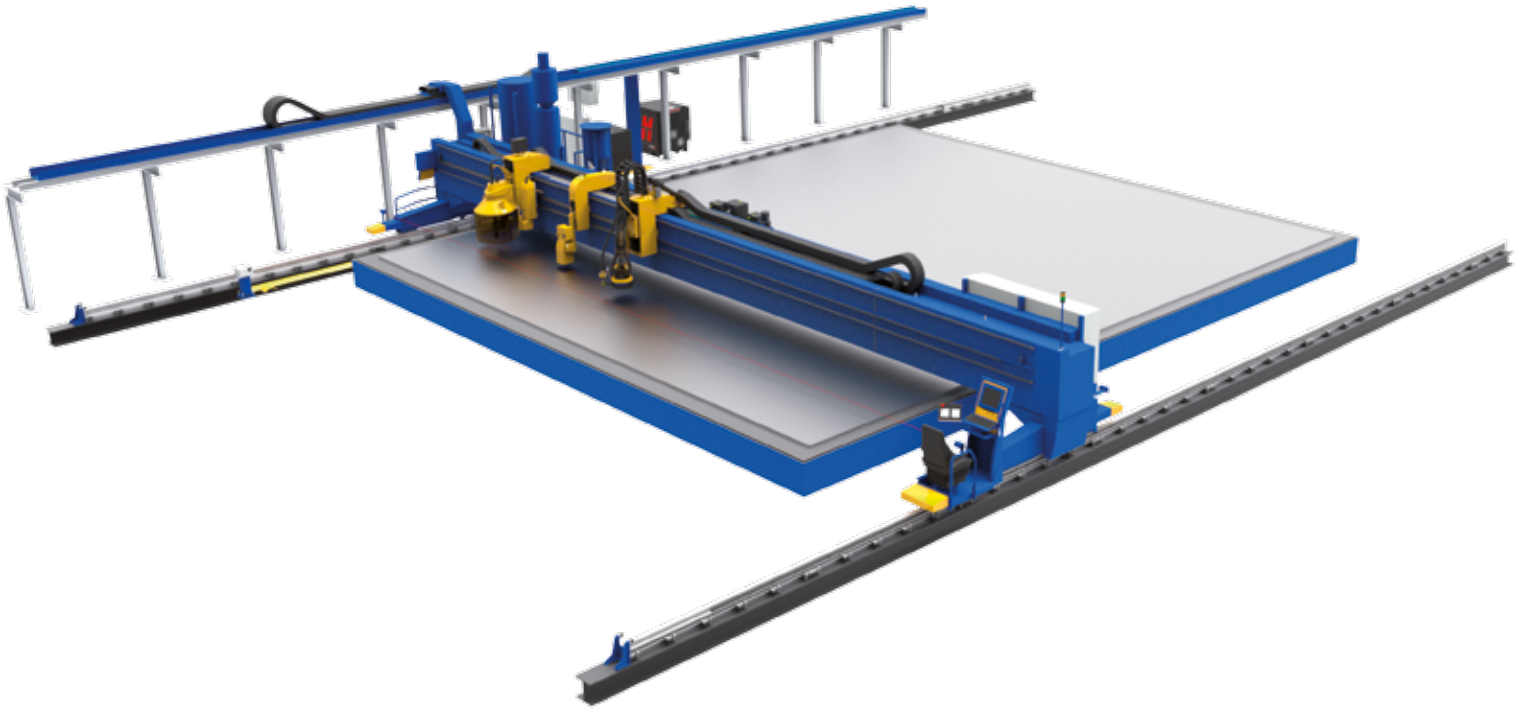

3D scanner


Automatic plate alignment


CCD camera


Blaster head


Grinding head



DRM 15001.130 FbMIPrk

www.irvingshipbuilding.com | www.shipsforcanada.ca

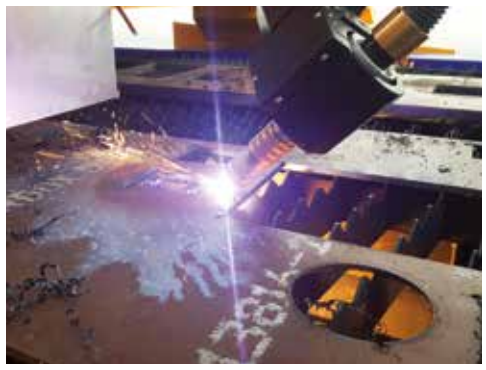
Irving Shipbuilding Inc. – Halifax / Canada

Irving Shipbuilding Inc. is the most modern shipbuilder and in-service ship support provider in North America. Headquartered in Halifax, Nova Scotia, the company's skilled team and innovative facilities provide efficient building, fabrication, conversion and servicing of vessels and offshore platforms. As Canada's chosen shipbuilder, Irving Shipbuilding is working with the Royal Canadian Navy on the next class of Canadian Surface Combatant (CSC) and Arctic and Offshore Patrol Ship (AOPS) vessels under the National Shipbuilding Strategy (NSS). Irving Shipbuilding Inc. is a member of the J.D. Irving, Limited group of companies, a diverse family owned company with operations in Canada and the United States.

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 whereby it offers a selection of different drilling tool stations and automatic tool magazines – for up to 16 tools. Optionally plate marking by inkjet or MicroPunch is possible. The machine finds its application in bridge or building construction companies.

Drilling & tapping | ACDB | Inkjet | MicroPunch | Automatic plate alignment | CCD camera



DRM 7501.30 PrkBGG
www.damatech.com

Damatech d.o.o. / Slovenia

Damatech is a steel service center specialized in pre-hardened steel. It has had a strategic partnership with SSAB for many years and is a Toolox and Hardox Wearparts partner. The company has many full automatic band sawing machines, water jet cutting machine and CNC machining centers. The last investment was into MicroStep's oxyfuel/plasma machine equipped with a drilling unit, enabling it to produce Hardox wear parts fast and cost-effectively.

DRM 28001.36 BI
www.kurganstalmost.ru

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.

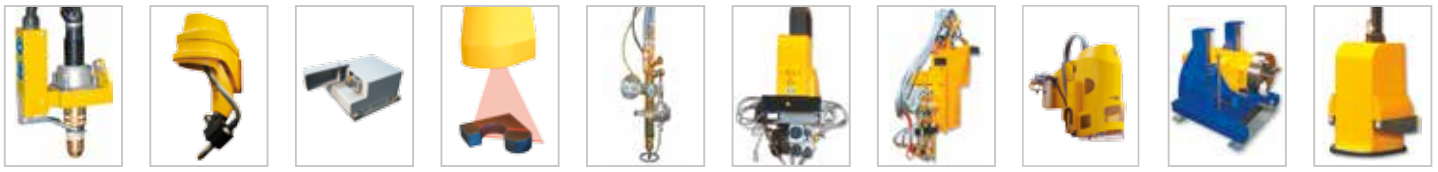
MG 12001.35 PrkGB + CH1200P
www.rw-montage.at

RW Montage GmbH / Austria

The RW Montage GmbH was founded in 1992 in Wels, Austria. The company's domestic and international operations are mainly in the fields of underground piping (gas, oil, district heating, water and wastewater area), industrial plant, station, steel bridge construction, building construction and track construction. In 2015 MicroStep installed as first machine in the production line a multifunctional plasma cutting system for bevel cutting, oxy-fuel cutting and drilling.

CombiCut Multi-functional CNC 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, MicroPunch or laser marking, pipe and dome processing as well as additional beveling process (ABP).



Plasma | Rotator | ACTG | ABP | Oxyfuel | Oxy tripple torch | G-multi | Drilling & tapping | Pipe & profile cutting | Inkjet

Laser marker | MicroPunch | Automatic plate alignment | CCD camera

TIKHVIN FREIGHT CAR BUILDING PLANT

CombiCut 6001.30Prk | CombiCut 6001.20Prk | 2 x CombiCut 6001.30P
CombiCut 6001.30PB | CombiCut 12001.30P | 5 x CombiCut 12001.30Prk
CombiCut 12001.30PGGGGGGG
www.tvsz.ru/en

Tikhvin Freight Car Building Plant / Russia

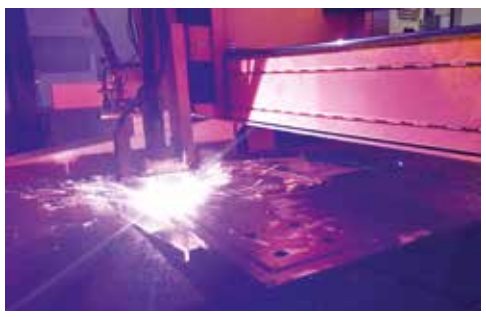
Tikhvin Freight Car Building Plant is a high-tech innovation enterprise, which meets the modern world standards in the sphere of transport machine building. Car assembling and foundry engineering have been combined in an effective production tandem that provides high productivity, flexibility of the production process and high quality level of manufactured products. High level of automation, application of modern design solutions and energy-efficient technologies ensure high level of production capacity on equal terms with leading global companies.

pt plazmatehnika

CombiCut 12001.25 PrkGB | OxyCut 8001.20 PGG
www.plazmatehnika.hr

Plazmatehnika d.o.o. / Croatia

Plazmatehnika d.o.o. is a private company operating mainly in the shipbuilding and offshore sector. Their main activities consist of fabrication of steel and stainless steel structures, pipe sections made from mild, Cunifer and stainless steel. Plazmatehnika continually investment in new equipment so that they can ensure the best quality of services and final products for their customers.



ZAMIL STEEL
" We Define Quality "

CombiCut 12001.30 BPG
www.zamilsteel.com

Zamil Steel Buildings / India

The Indian subsidiary of Zamil Steel Buildings Saudi Arabia, is a major player in fabrication and erection of pre-engineered buildings and structural steel. Since the start of commercial production in February 2008, Zamil Steel India has supplied more than 1250 projects comprised of more than 5000 buildings with an approximate area of 4 million m^2, such as petrochemical projects structures, power plant structures, aircraft hangars etc.

MasterCut CNC plasma & oxyfuel cutting machine

MasterCut is a versatile high-precision CNC cutting machine which can be applied throughout the industry reaching from small workshops to big factories. The application range of the standard version with rails in the X direction dedicated to fully automated oxyfuel 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. A 3D tilting tool station enables to perform a great portion of common bevel cutting jobs.

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 | PLS 13501.25 PGGI
www.caterpillar.com

Rimorchi Bertoja S.p.A. / Italy

Rimorchi Bertoja S.p.A. was founded in 1926 by the Bertoja family. Excellence from 83 years of experience makes it a European leader in design, production and sale of special and heavy-weight trailers and semi-trailers. The company's philosophy is to create more value for customer by offering high standard quality and customization. Over 100 employees including a team of engineers and industrial designers assure the continuous improvement of the products.

bertoja

MasterCut-X 12001.25 P
www.bertoja.it/eng

Willems (Smulders, Eiffage Group) / Belgium

Willems is part of Smulders (part of the French group Eiffage), an international organization that helps to realize unique and challenging projects in three different market segments: Offshore Wind, Offshore Oil & Gas, and Civil & Industry. Design, production and assembly are executed in-house. Smulders has multiple facilities with a total of 875 employees, of which 65 in Engineering departments, located in Arendonk (Belgium), Balen (Belgium) and Bangalore (India).

EIFFAGE WILLEMS

MG 27001.40 PrkP + 1.40 GGGP
www.willems.be/en

MasterCut Compact CNC plasma & oxyfuel cutting machine

MasterCut 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 components, it smoothly delivers latest features of plasma technology for a decent price – true contours, small holes, sharp corners and efficient operation. As a fully compact 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, a 3D tilting tool station enables to perform a great portion of common bevel cutting jobs.


Plasma


3D tilting


ACTG


Oxyfuel


Pipe & profile cutting

3 x MG 18001.25 PrkGGB
www.nov.com/kostroma

National Oilwell Varco Kostroma / Russia

Since 1994, NOV has offered robust, innovative solutions to answer the challenges of Russia's complex oil and gas industry. It offers a huge selection of products across its three segments: NOV Rig Systems, NOV Wellbore Technologies and NOV Completion & Production Solutions. From a single product to an expertly designed custom system, the company develops innovative solutions that help their customers achieve their business goals.

Ferropatent Group
The Patent Solution for Steel

MSF 6001.25 Ltk + T500CH | MG 7501.20 PrkB
www.ferropatent.hu

Ferropatent Group / Hungary

Ferropatent Group was founded in 1992. Presently it consists of its own trading company, metal-processing company and logistic company that operate a roofed store of 15,000 m2, housing an average stock of 15,000 metric tons of various steel material, equipped with facilities enabling direct delivery to customers and processing of the material: plasma, flame and laser cutters, straightening, rolling and sandblasting machines as well as two sawing machines.

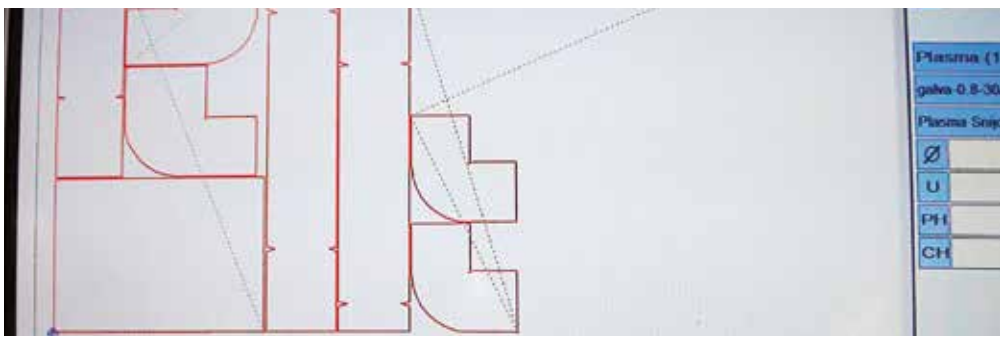
METALLBAU STEG AG
Stahl- und Anlagebau, Mech. Werkstätte

MG 6001.25 PrkB + CH1200P
www.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.

AirCut CNC plasma cutting machine



AirCut 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.

Plasma

MSF 12001.30 LtkL
www.adq.it/en

Acciai di Qualità S.p.A. / Italy

ADQ is an Italian leader in distribution and pre-processing of heavy plates and coils in high quality steel grades for a great variety of industrial applications. Thanks to long established relationships with some of the main European steel producers, ADQ can supply a complete and up-to-date range of plates in commercial sizes or pre-processed according to costumer's request, with quality and production certifications.

MSF 3001.15 Ltk + MT
www.svealegosmide.se

Svea Legosmide AB / Sweden

Svea Legosmide AB is a Swedish metal working company mainly specializing in forging parts for agricultural equipment. A part of the company is working as a job shop offering a range of services such as forging, hardening, laser cutting, drilling, painting and assembly. With its new MSF laser cutting machine combined with an efficient loading/unloading by MicroStep, the company became very competitive in offering laser bevel cutting to its customers.

MSF 3001.15 L + MT

Zetalaser Sas Di Zanotto L. & C. / Italy

Zetalaser Sas Di Zanotto L. & C. does business in the field of medium-light carpentry. It specializes in processing of raw materials and various alloys. Being market-oriented and closely following development of state-of-the-art technology, it has been among the first to start using laser cutting, in order to facilitate the work of its customers by offering quality and speed.

ProfileCut CNC pipe, profile & sheet cutting machine

ProfileCut 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.

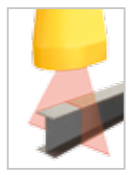

Pipe & profile cutting

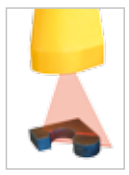

Plasma


Rotator


3D rotator 120°


ACTG


3D scanner


ABP


Oxyfuel


G-Multi

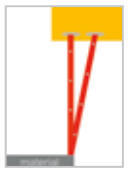

Oxy triple torch


Drilling & tapping


Inkjet


MicroPunch


Laser marker


Automatic plate alignment


CCD camera

ProfileCut 27001.900 SPpk
www.xchualing.com

Xuancheng Valin Precision Technology Co., Ltd. / China

Xuancheng Valin Precision Technology Co., Ltd. is specialized in manufacturing and selling elevator counterweight blocks, elevator compensation cables, and other machinery accessories, sheet metal and processed products. In the 10 years since its founding, the company maintained a sound momentum of development with a yearly growth rate of 10% and more. This effort made it a leader in the industry with a market share of nearly 26 % in 2014.

NAMAQUA ENGINEERING

ProfileCut 13501.20 Ppks + P | MSF 3001.15 L
www.namaqua-eng.co.za

Namaqua Engineering / South Africa

Namaqua Engineering includes all major engineering disciplines in their company. It was founded in 1998 in Vredendal by Stokkies van Zyl who identified the need for engineering services in the area. Its management team consists of qualified members dedicated to providing competent and professional services in accordance with international standards. It has more than 15 years' experience in the wine, mining and construction industries.

Antonelli G. s.r.l.
Lavorazione e Finitura Metalli

AquaCut 6001.20 Wrks | MSF 4001.20 L + T300
www.gruppo-antonelli.it

Antonelli G. / Italy

The Antonelli G. company comes from a tradition of craftsmanship with over 40 years of experience in the metallurgy sector. It has evolved into a high-tech company aiming for constant innovation and technical updates. Antonelli G. offers processing and finishing of metals, such as iron, stainless steel and aluminum. The production site, located in the industrial area of Acilia – Dragona (near Rome), covers an area of 4,000 m^2, 2,000 of which are indoors.

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.


Pipe & profile cutting


Plasma


Rotator


3D rotator 120°


ACTG


3D scanner


Oxyfuel


Inkjet


MicroPunch


Laser marker

EIFFAGE SPOMASZ

MG 24001.40 PrkGGGG
www.spomasz-zary.pl/en

F.K.S.I.M. Spomasz S.A. / Poland

Spomasz is part of Smulders (part of the French group Eiffage), an international steel construction group. Spomasz can boast of many years of experience in the comprehensive construction of large-scale steel structures. It produces special-purpose steel structures in the field of investments related to the acquisition of renewable energy in the offshore area and mining for oil and gas. The entire production process is carried out using the highest quality materials that meet all technical standards.

REIJRINK bv STAALCONSTRUCTIE ESBEEK & SOMEREN

DS 6001.20 PrkGMeBrk | PLS 6001.20 P + CH800
www.reijrink.com/en

Reijrink Staalconstructie BV / Netherlands

Reijrink Staalconstructie BV, founded in 1967, consists of a construction factory in Esbeek and a steel construction works in Someren. Since its establishment, the company has developed from a sole proprietorship into a renowned, medium-sized company with about 100 enthusiastic employees specializing in design, manufacture and assembly of constructions, such as warehouses, office buildings, shelters, houses and stables. The company also manufacture stairs, railings and fences.

ŽOS ZVOLEN

MG 12001.25 PrkMB
www.zoszv.sk

Železničné opravovne a strojárne Zvolen, a.s. / Slovakia

Železničné opravovne a strojárne Zvolen, a.s. (Railway repair and machine works Zvolen) is a prominent Slovak company for repairing train locomotives. ŽOS Zvolen builds upon a 145 year long tradition. Its immediate predecessor, a railway works in Zvolen, was founded in 1872. The company's current repair portfolio includes a wide assortment of locomotives and railcars, passenger trail cars according to customers' requests and wheelframes.

PipeCut CNC pipe & profile cutting machine

PipeCut 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.


Pipe & profile cutting


Plasma


Rotator


ACTG


3D scanner


Oxyfuel


Inkjet

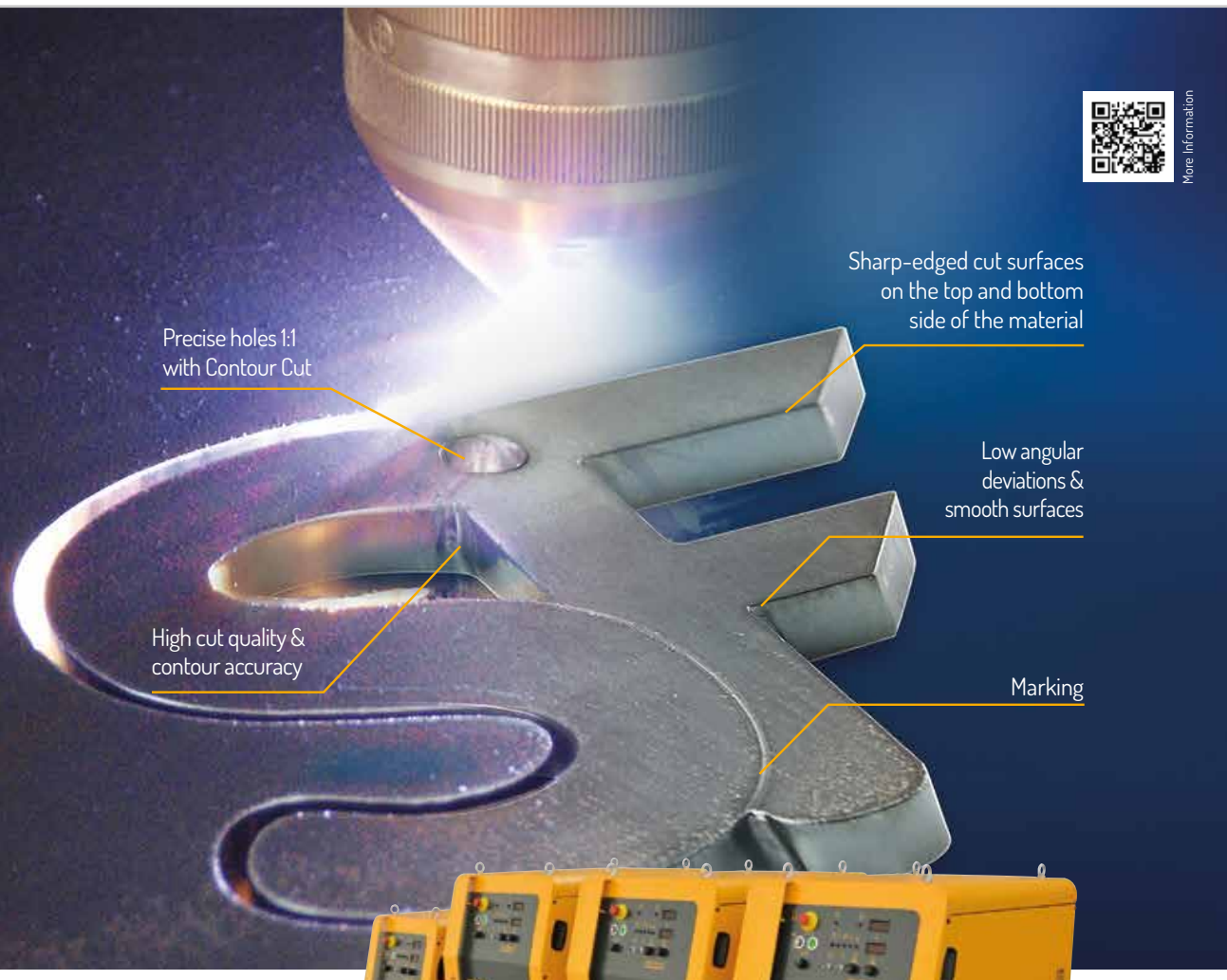

MicroPunch


Laser marker

Contour Cut Technology **Precision** in Detail

All HiFocus and Smart Focus units* use the patented Contour Cut technology for precise cutting of mild steel.

Kjellberg® FINSTERWALDE



Without Contour Cut

With Contour Cut

Bevel cutting

Underwater plasma cutting

.kjellberg.de

Contour Cut: Precision in detail

All HiFocus and Smart Focus units* are equipped with the Contour Cut technology for cutting mild steel: Small contours, narrow webs and holes with a diameter to material thickness ratio of 1:1 can be cut in excellent quality. Contour Cut Speed allows the cutting of contours with a speed that is up to 50 % faster.

- **HiFocus 130 neo**
- **HiFocus 161i neo**
- **HiFocus 280i neo**
- **HiFocus 360i neo**
- **HiFocus 440i neo**
- **HiFocus 600i neo**
- **Smart Focus 130**
- **Smart Focus 200**
- **Smart Focus 300**
- **Smart Focus 400**

HiFocus: Efficient & for versatile applications

The plasma cutting units of the HiFocus neo series meet the highest demands in the cutting range between 0.5 and 160 mm. Due to the focussed plasma arc laser-like cuts at highest speeds and low costs per cutting metre are achieved. The plasma cutting units can be used in connection with CNC cutting systems, pipe cutting systems or robots, and also for marking, bevel cutting and underwater plasma cutting (HiFocus 280i neo - 600i neo).

*except for HiFocus 80i

Smart Focus: Simply good cutting

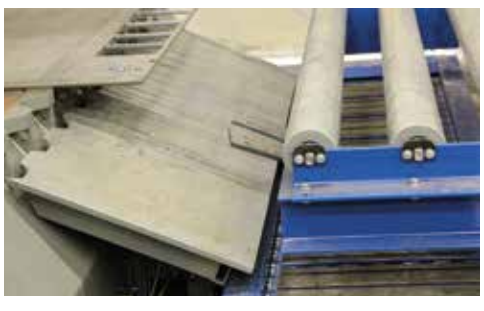
With just a few settings the compact plasma cutting units of the Smart Focus series achieve excellent results in the cutting range from 1 to 100 mm – even under most challenging conditions. The Smart Focus units can also be used for marking, bevel and underwater cutting – made in Germany.

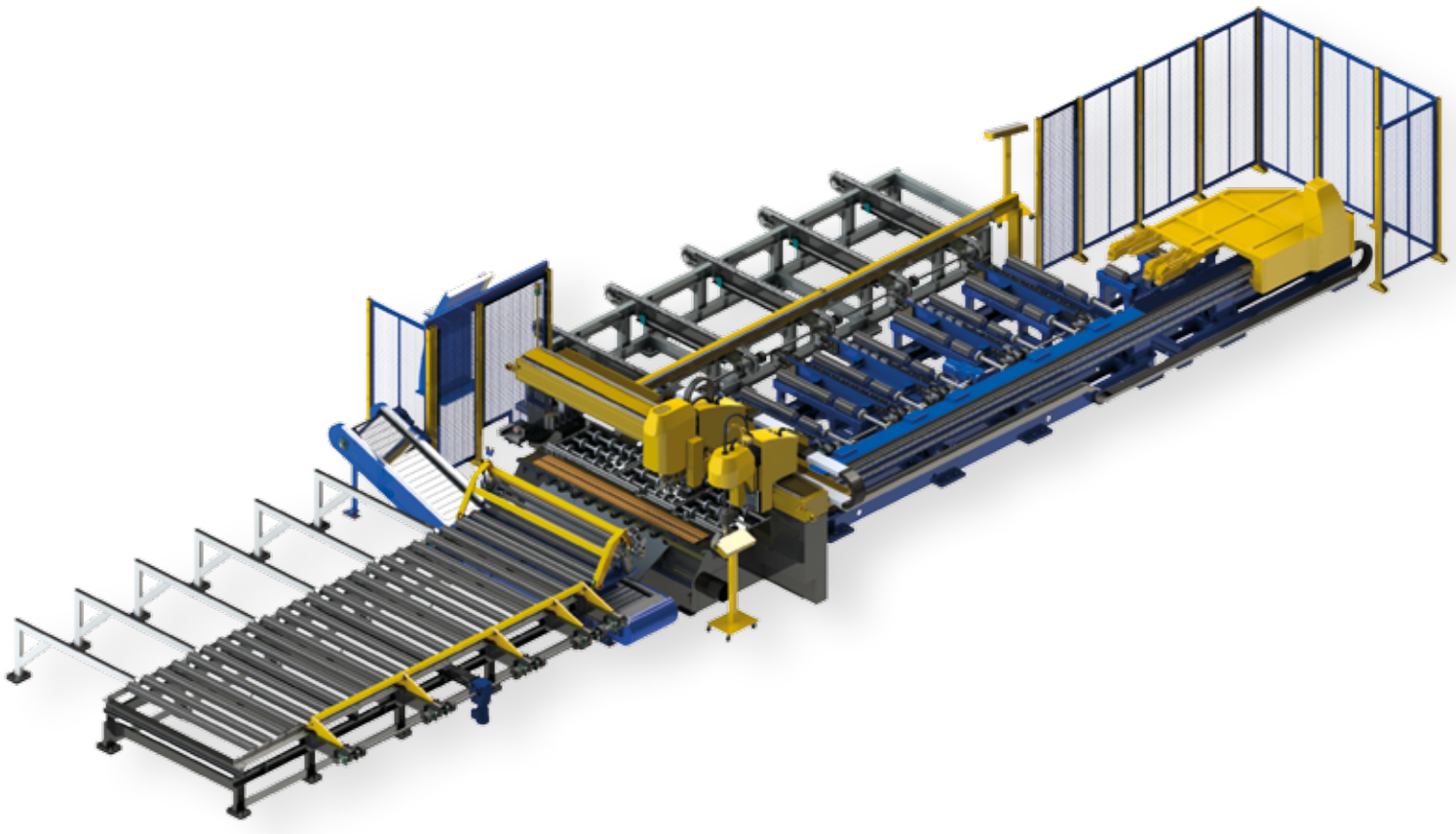
+ 49 (0) 3531 500-0

vertrieb@kjellberg.de

DS Automated plate processing line

DS 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.






Drilling & tapping


Plasma


Rotator


ACTG


ABP


Oxyfuel


G-Multi


Inkjet


MicroPunch


Laser marker

NEARLY 50 YEARS OF SHAPING POSSIBILITY

With the right tools and a relentless focus on innovation, partnership and community, we believe anything is possible.

PLASMA | LASER | WATERJET | AUTOMATION | SOFTWARE | CONSUMABLES

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Hypertherm®
SHAPING POSSIBILITY™

MSF Fiber laser cutting system

MSF machine is a powerful laser cutting system for cutting of materials with a fiber laser. 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 equipped with an automatic shuttle table up to the size of 12 x 3 m, or a moveable and slideable protective cabin for greater working areas. The optional equipment include pipe and profile cutting devices up to Ø500 mm, bevel cutting head and turret tapping head.


Laser

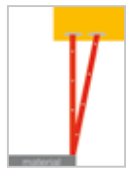

Laser rotator

Nozzle calibration


Plasma


Pipe & profile cutting

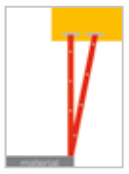

Drilling & tapping


Automatic plate alignment

MSF-Eco Fiber laser cutting system

MSF-Eco machine is a powerful yet cost-effective version of MSF – without compromising any of the dynamic properties of the MSF line. The machine is designed for production of highly accurate parts at high cutting speeds with a single cutting head, with surprisingly low maintenance and operational costs. The machine is equipped with a single grate system which is pulled from the cabin to the front of machine to ensure convenient loading/unloading. The machine sizes are 1 x 2 m, 1.25 x 2.5 m and 1.5 x 3 m.

Laser



Automatic plate alignment

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. The features include ACTG, ABP and ABC compensation of straightness of cuts.


Waterjet | W-Multi | Waterjet rotator | ACTG | ABP | Plasma | Rotator


Pipe & profile cutting | Tapping | Sludge removal conveyor

WaterCut CNC waterjet cutting machine

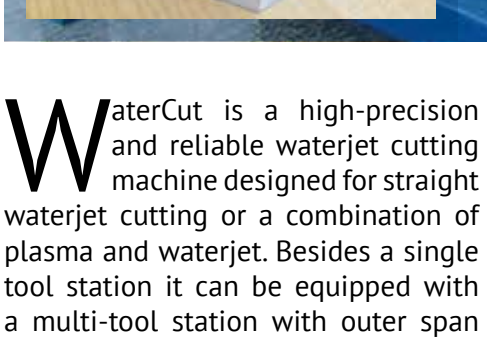
WaterCut is a high-precision and reliable waterjet cutting machine designed for straight waterjet cutting or a combination of plasma and waterjet. Besides a single tool station it can be equipped with a multi-tool station with outer span 1200 mm, carrying up to 4 water jets on one Z axis, or a small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


Waterjet


W-Multi


Plasma


Sludge removal conveyor



BFT HIGH PRESSURE TECHNOLOGY FOR WATERJET CUTTING

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

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

Available are pumps with flow rates from 0.8 to 7.6 l/min and corresponding power ratings from **7.5 to 75 kW**. Highlights of BFT high pressure pumps are **large volume accumulators** for low pressure fluctuation, integrated oil/air cooler as well as **easy maintainance**, high reliability of components and the **highly energy efficient** and **patented SERVOTRON® technology**.

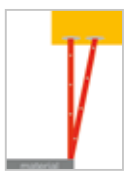
BFT
Best Fluid Technology

BFT GmbH, Industriepark 24
A-8682 Hoenigsberg, Austria
Phone: +43-3862-303-303
Fax: +43-3862-303-304
info@bft-pumps.com, www.bft-pumps.com

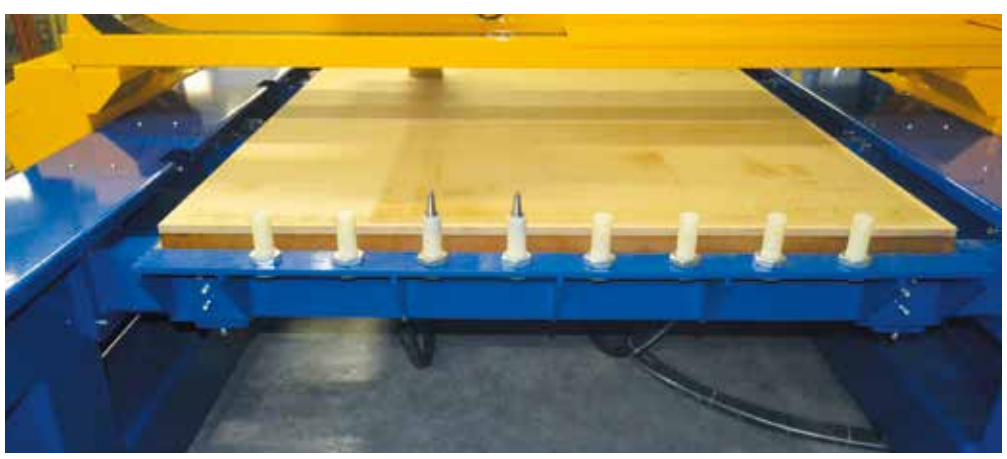
MicroMill CNC routing machine

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.


Milling


Automatic plate alignment


CCD camera



Special designs

Apart from standard cutting machines MicroStep is able to deliver also tailored solutions and machines for custom applications, solutions combining different non-standard technologies, production lines, 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, laser, waterjet and drilling/tapping technologies, plate processors, working cells for handling of workpieces by robot positioners and special-purpose welding machines.

Robot applications

MicroStep's continuous activity in the area of robot applications resulted over the years in a comprehensive product line of components for robotic working cells – different types of part positioners, gantry-type and cross-beam travel systems and standardized modular welding cells are part of the portfolio. The supplied projects include turn-key applications such as 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, a test cell for partial simulation of a working line, automated cutting of ceramic tanks, cutting of coupons from hot rolled steel and many more.

AquaCut 1001.20 WW + MTR
www.villeroyboch-group.com | www.mondial.ro

Mondial S.A. (Villeroy & Boch Group) / Romania

Villeroy & Boch AG, of which Mondial SA is a part, is a highly innovative company with a time-honored tradition, one of the most important brands in Germany, Europe and the world. Since its origins, the ceramics manufacturing company founded in 1748 has developed into an international lifestyle brand. It is now represented in 125 countries around the world and has production facilities in Europe, Mexico and Thailand.

Plasma Cutter 501.36 P + MTR
www.ahmsa.com

Altos Hornos de México, S.A.B. de C.V. (AHMSA) / Mexico

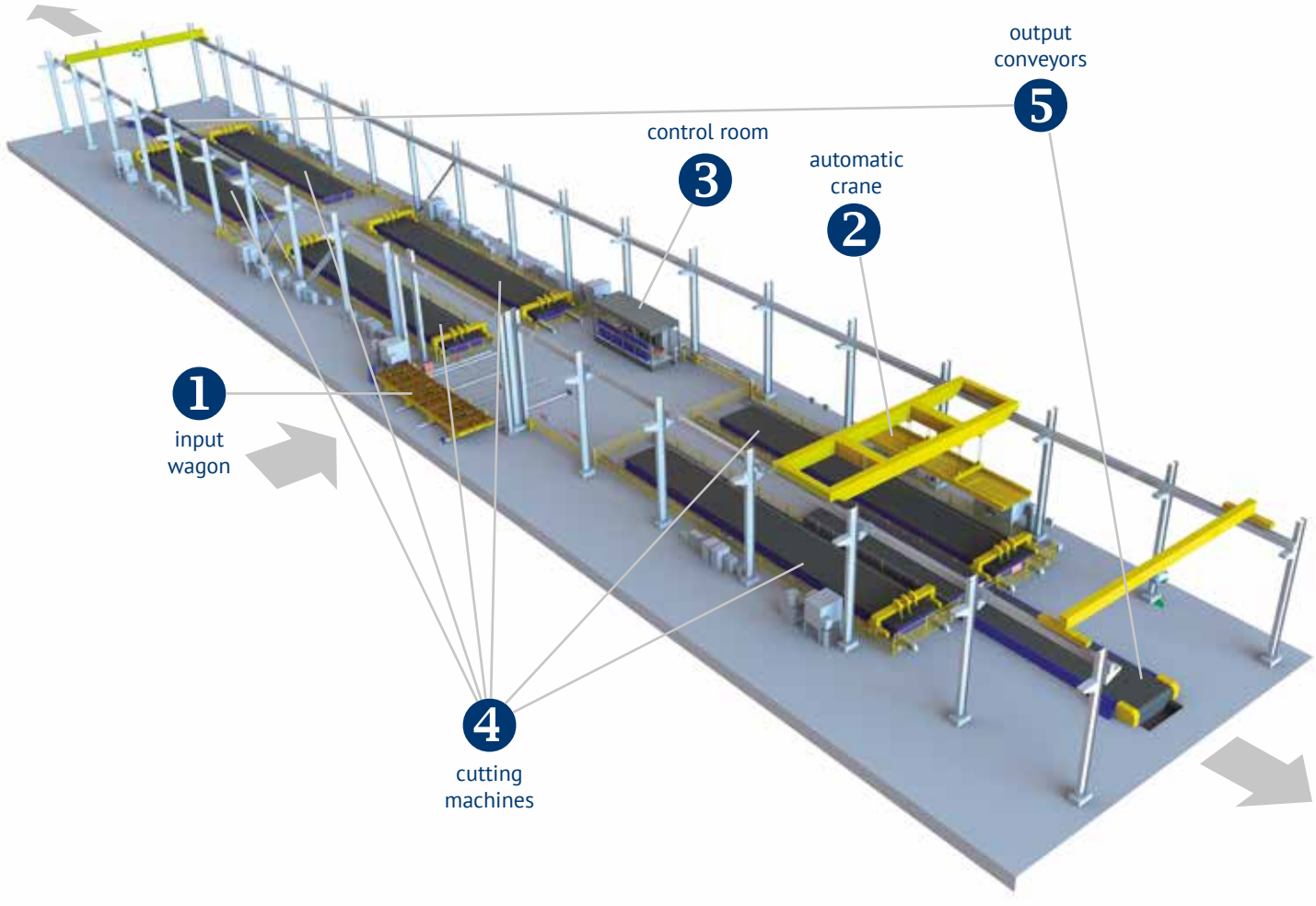
AHMSA is the largest integrated steelworks in the country. It operates a vast industrial chain, from iron ore and coal extraction to manufacture of different kinds of steel and steel products. It currently operates at a rate of close to 5 million metric tons of liquid steel annually, and has a workforce of 19,000, including its mining subsidiaries.

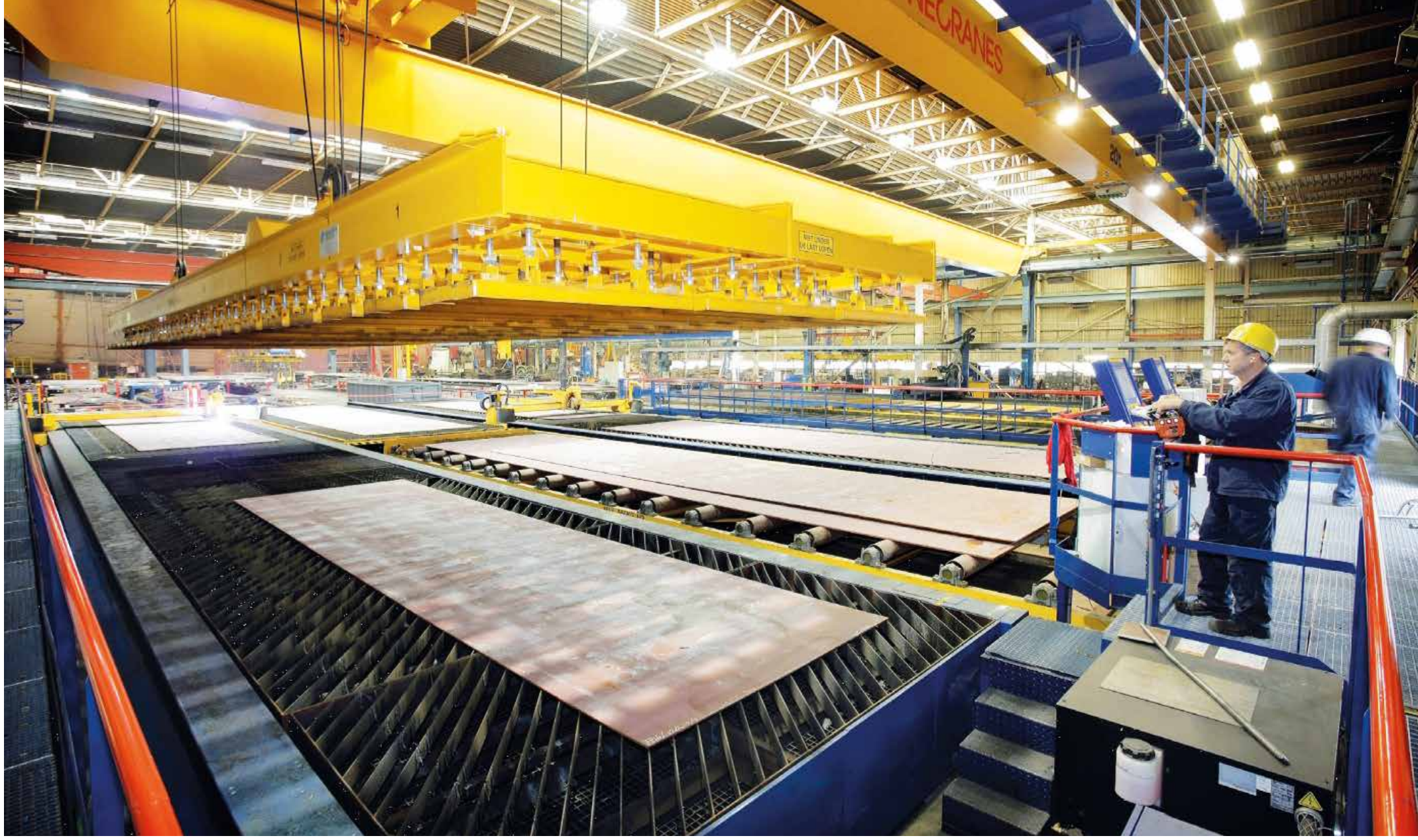
Automatic cutting line

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 distribution 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.

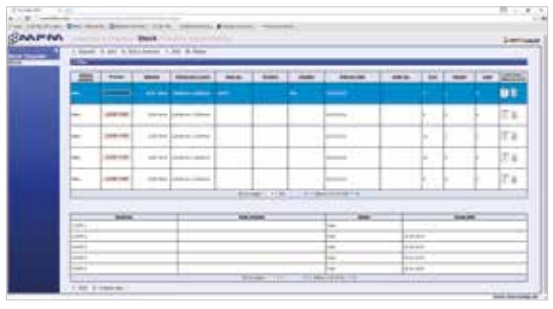




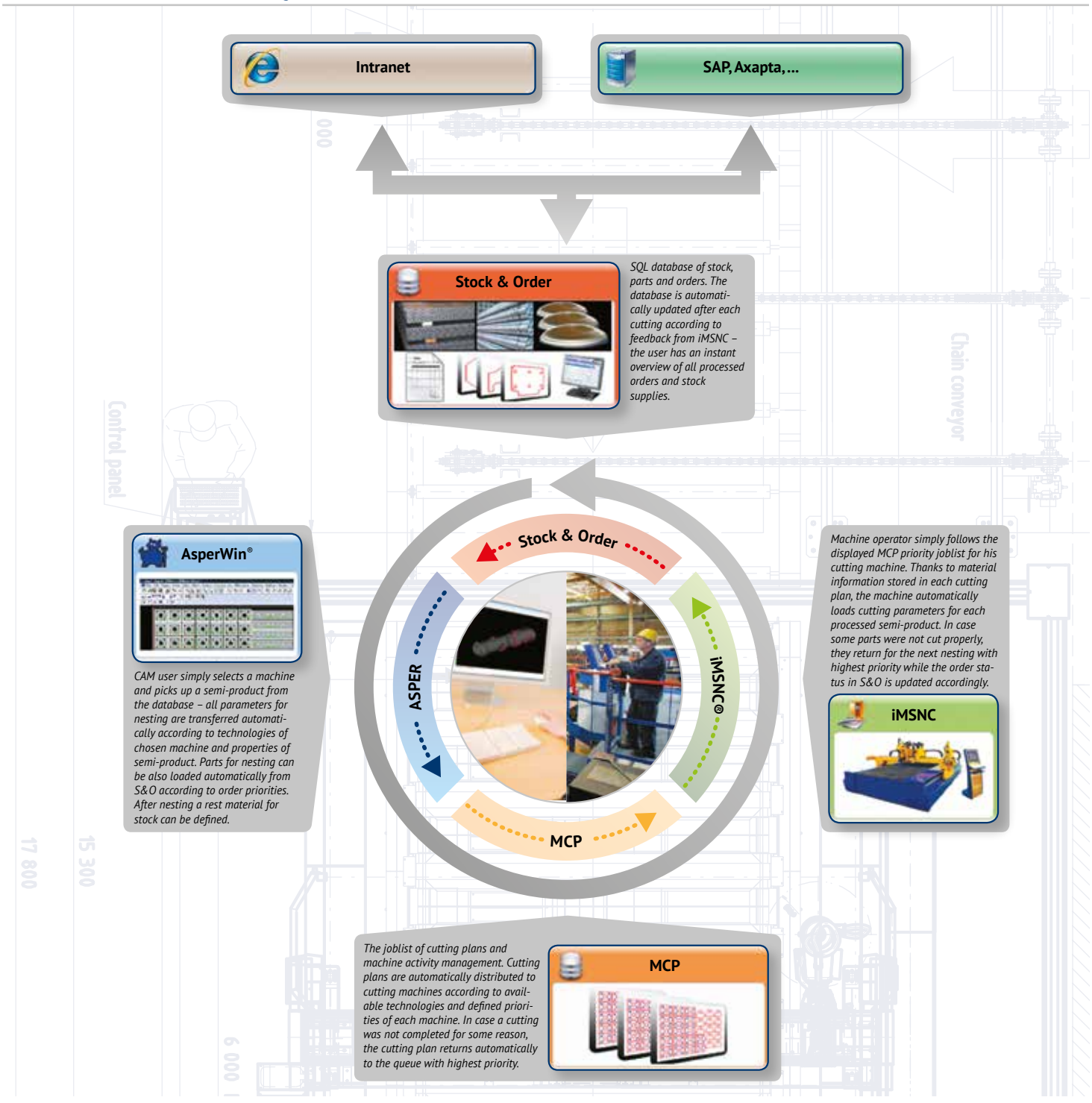
MPM: MicroStep Production Managment

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 evalution 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.

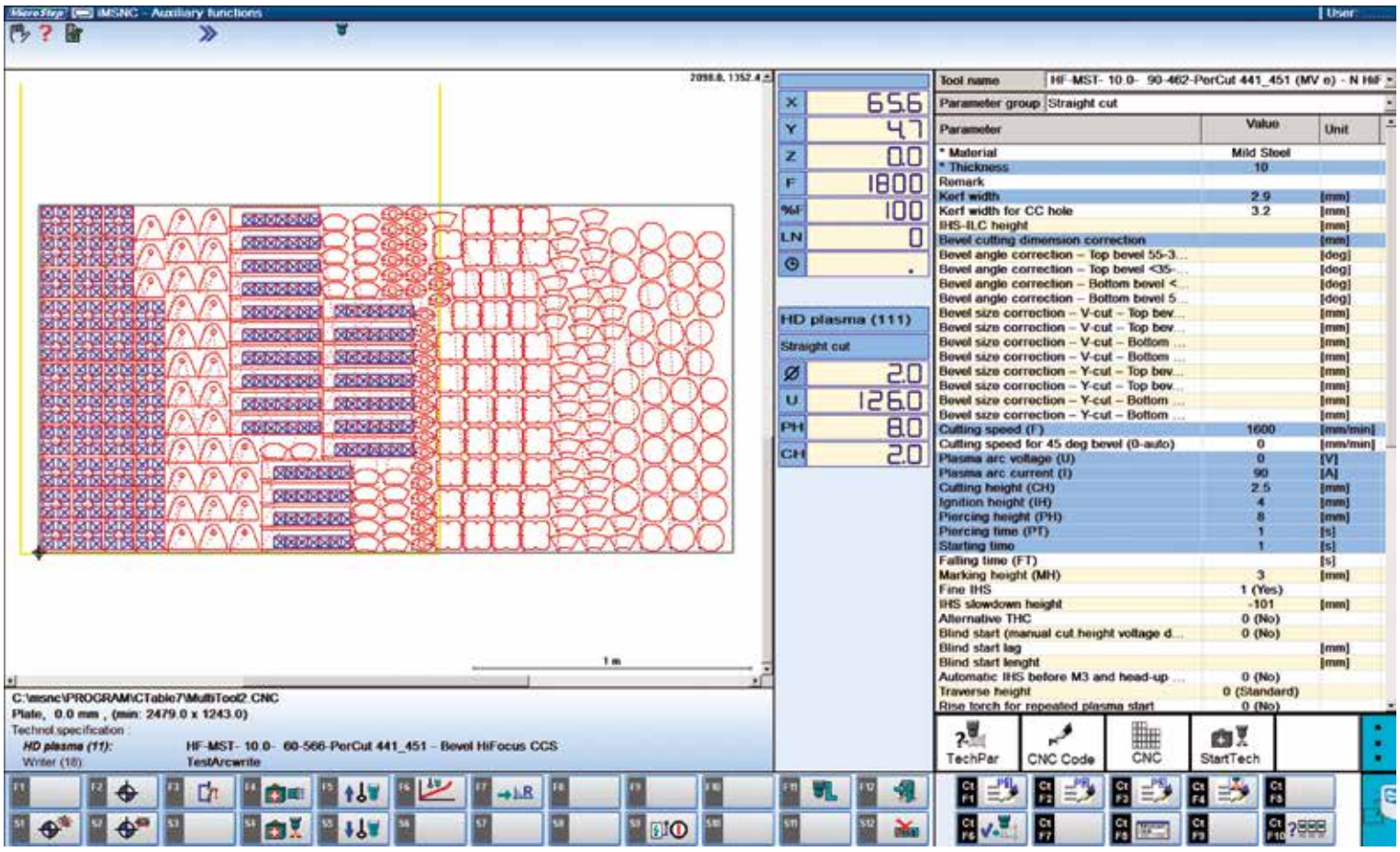
Although designed for MicroStep machines with AsperWin® CAM and iMSNC®, MPM also offers possibilities of cooperation with third party machines. Naturally, the production data can be shared with customer´s ERP system (e.g. SAP, AXAPTA). For effective production planning, the system provides weight analysis of particular orders along with weight reports of actual stock resources.



MPM – Production cycle



iMSNC®



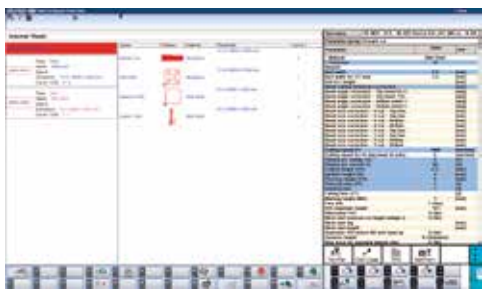
MicroStep´s in-house developed control system iMSNC® provides easy, user friendly and thus reliable operation of cutting machines via modern user interfaces: a standalone operator console with TFT touch screen and one or two control panels with LCD displays on the sides of the gantry. The convenient 24" monitor displays all data for preparation of cutting in a single screen and thus provides a clear overview of the cutting process. Additionally, the configurable right part of the screen contains shortcuts to up to 5 custom applications in each screen.

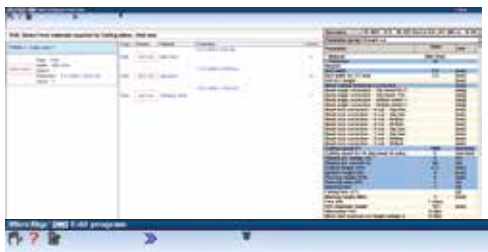
To achieve maximum utilization and flexibility of machine operation, a standalone operator console allows to prepare and edit cutting plans simultaneously with the cutting process. Since the machine, the control system iMSNC® and the CAM software AsperWin® are from one producer – MicroStep – it allows to implement non-standard requests and develop custom solutions as well.

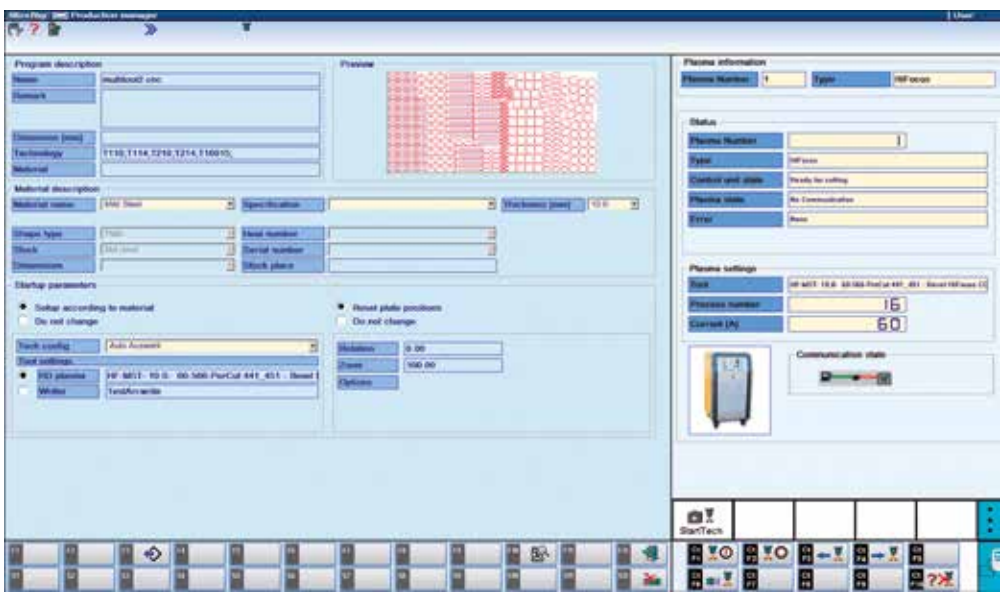
Integrated parameter databases for different technologies ensure high efficiency and stable quality of cutting. The operation is quick and easy through a touch screen with interactive elements with pop-up help. Advanced Remote diagnostics tools enable direct remote control of the machine, control system 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.

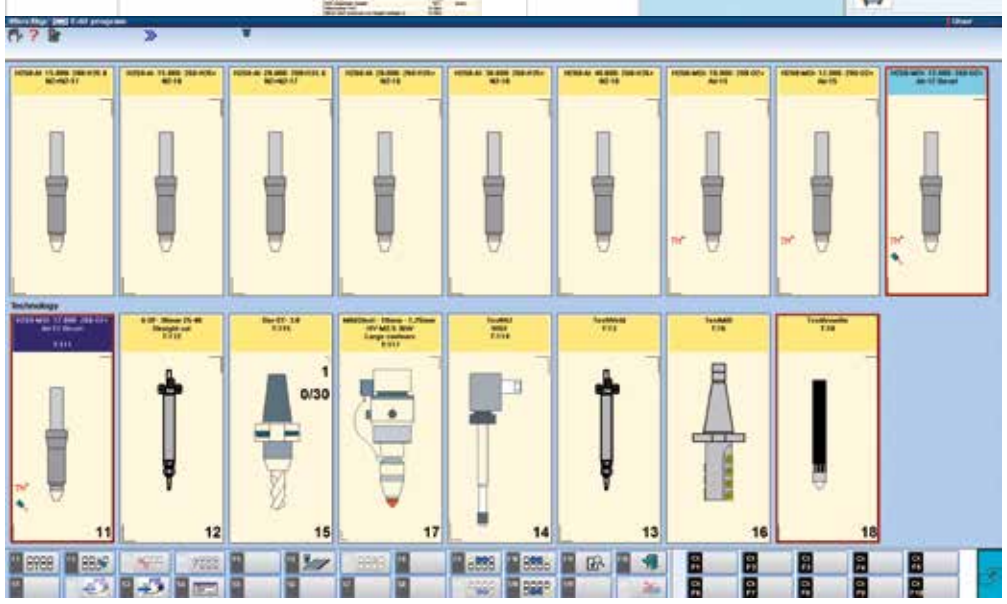
Features

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.



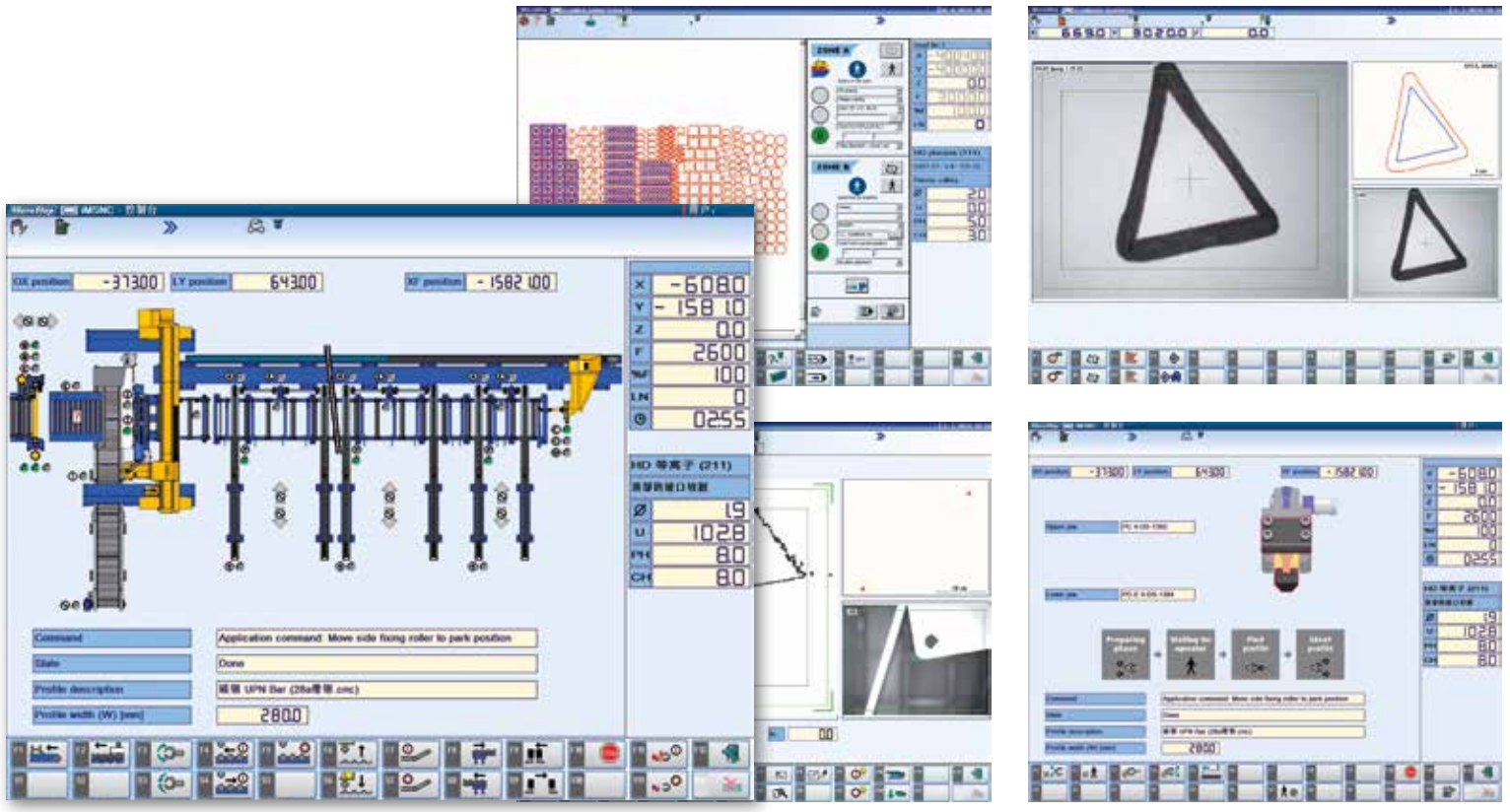






Enhanced functions

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

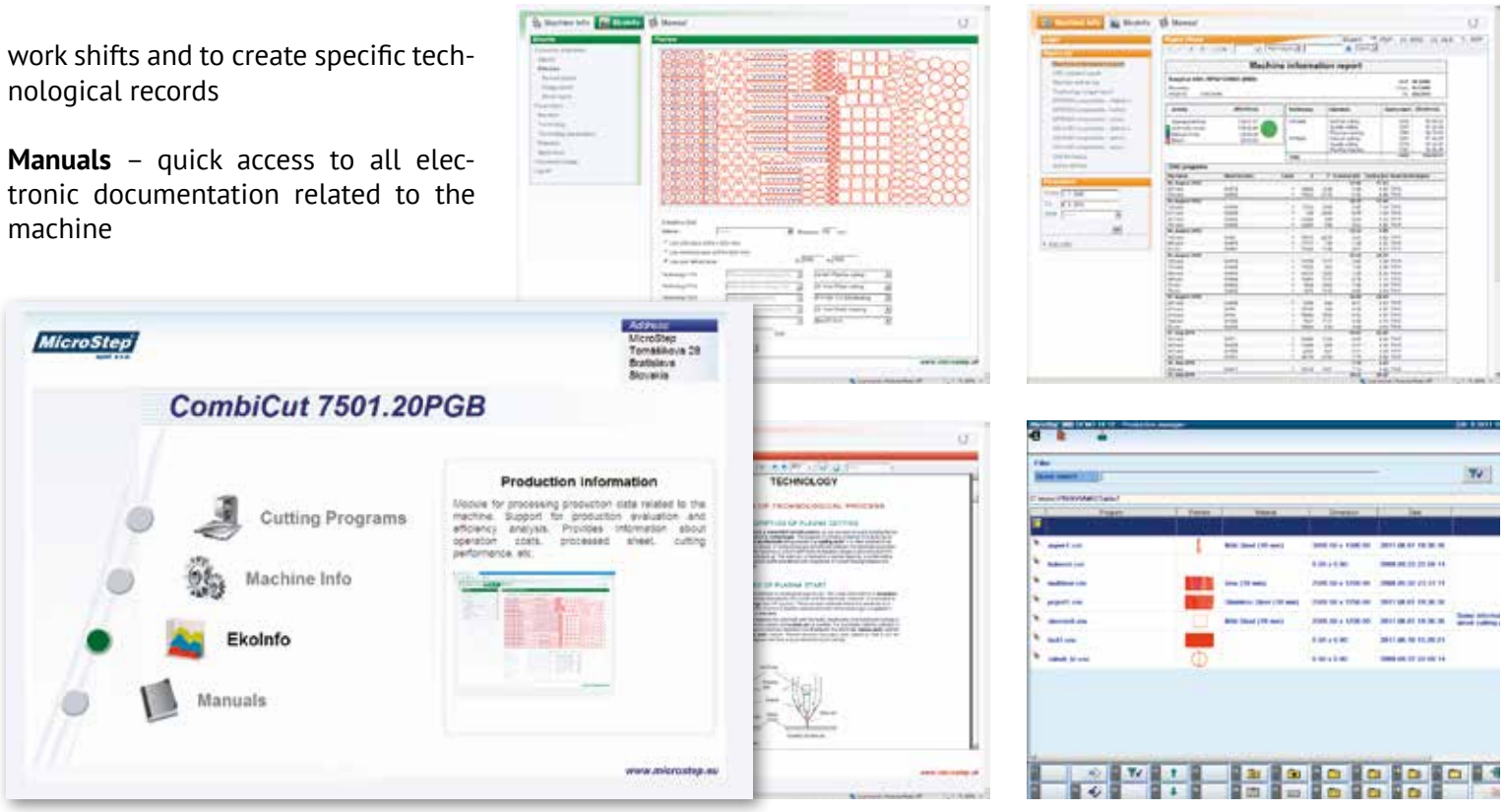
iMSNC® includes a novel web-based interface for accessing each machine from the company intranet via a web browser. Each machine has its own home page which serves as a gateway for intranet applications.

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 information to work shifts and to create specific technological records

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



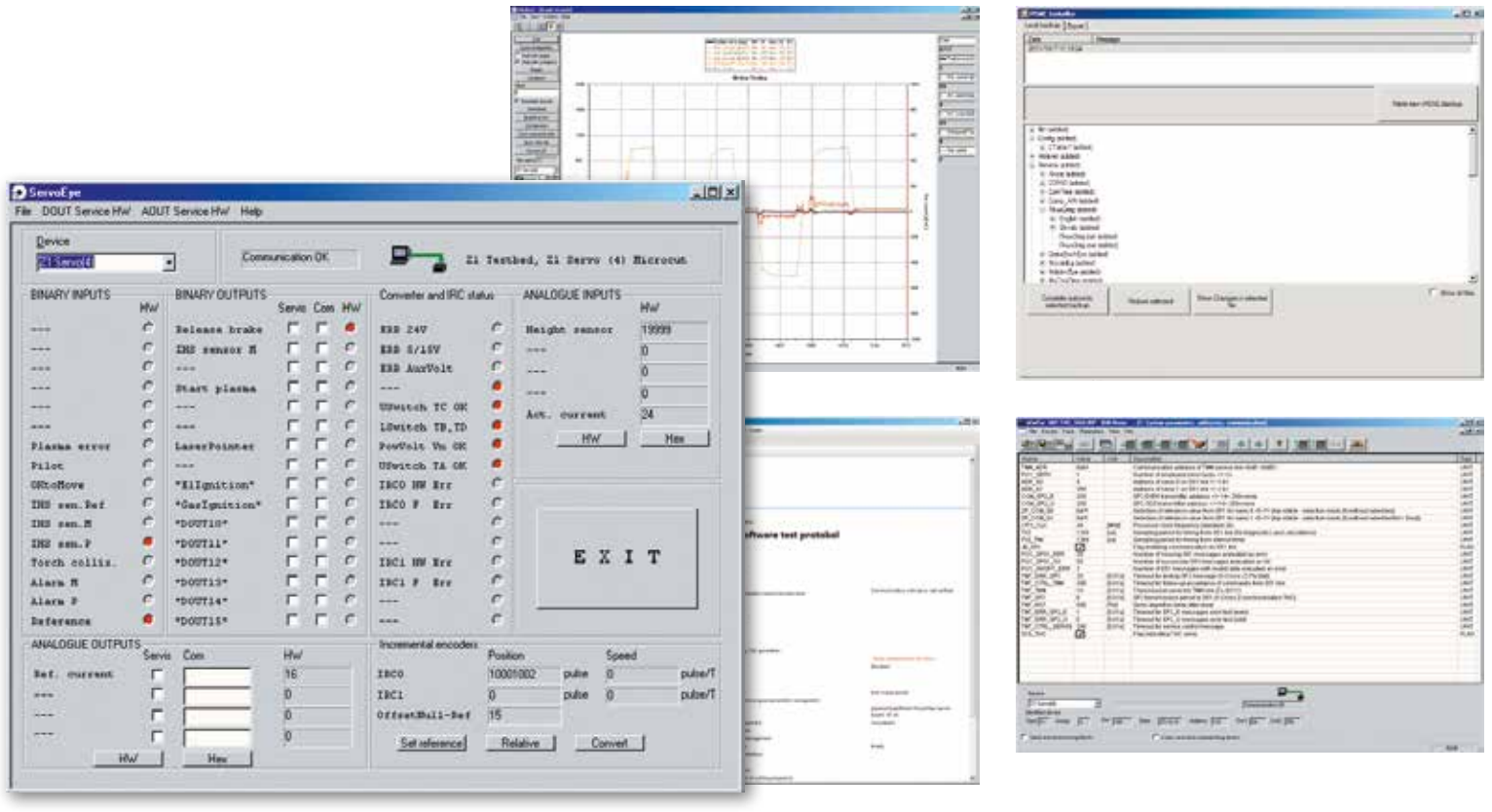
Service applications

Advanced backup options:

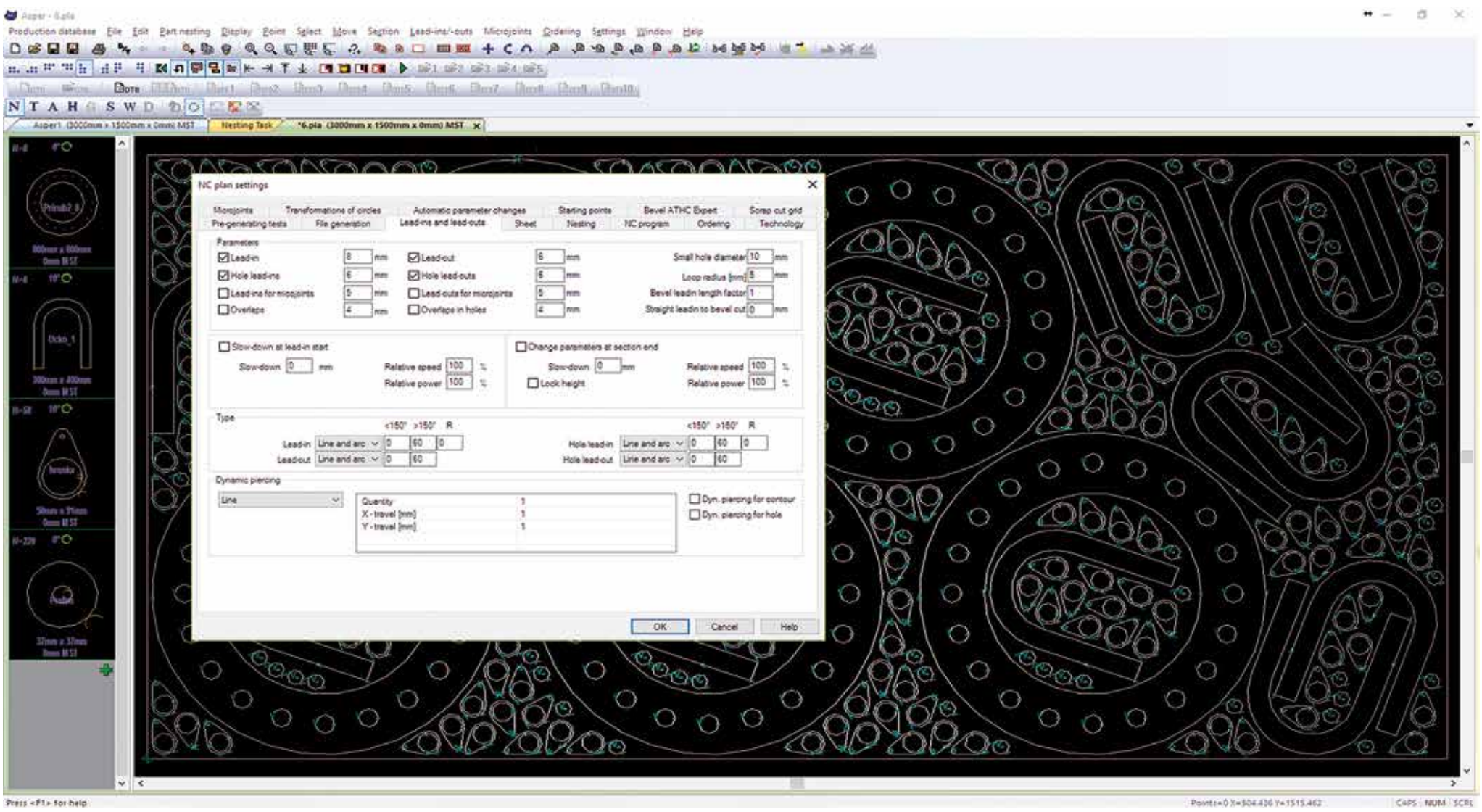
Local backup - stored on machine´s HDD preserves the history of changes. It can be used for evaluation of changes between the actual state and a history point or between any history points.

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 Solutions for Smart Industry

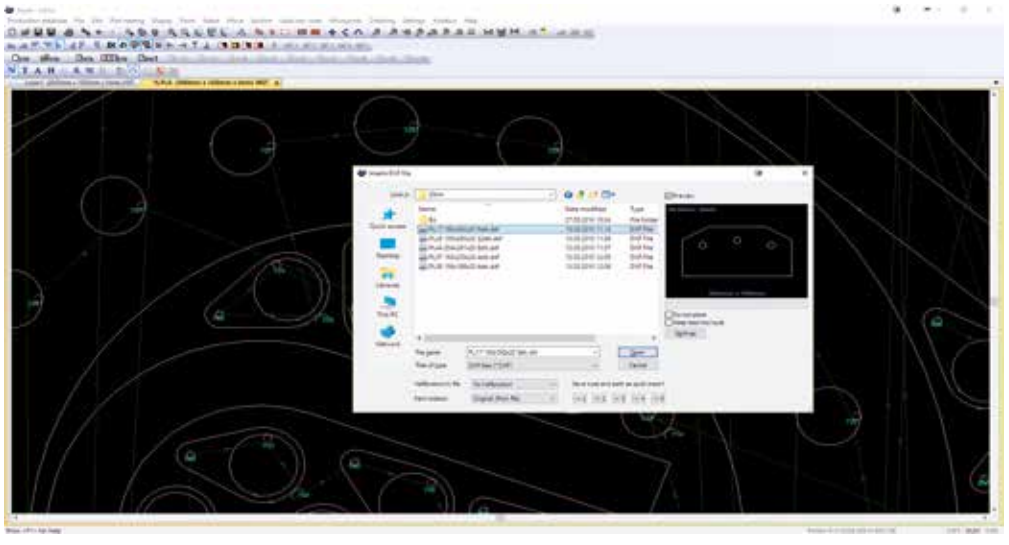


MicroStep's CAM software AsperWin is the result of 15+ years of intense development and continuous customer driven improvement in the area of software applications for CNC machinery. It unifies the practical programming experience with long-term user know-how and an intuitive, transparent way of operation. AsperWin provides tools for easy and fast creation of NC programs for different cutting technologies. AsperWin is primarily designed for 2D straight and bevel cutting and supports also 2.5D applications such as cutting of pipes. Apart from that, it also support other technologies, such as marking, drilling, milling and combinations of 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, and multi-torch cutting) and eventually fitted to customer's special requests. With its transparent 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.

Notable improvements brought by the newest Asper version include interface redesign, improved tool configuration management, new import options, scrap cutting, PowerHole support, enhanced drilling support and much more.

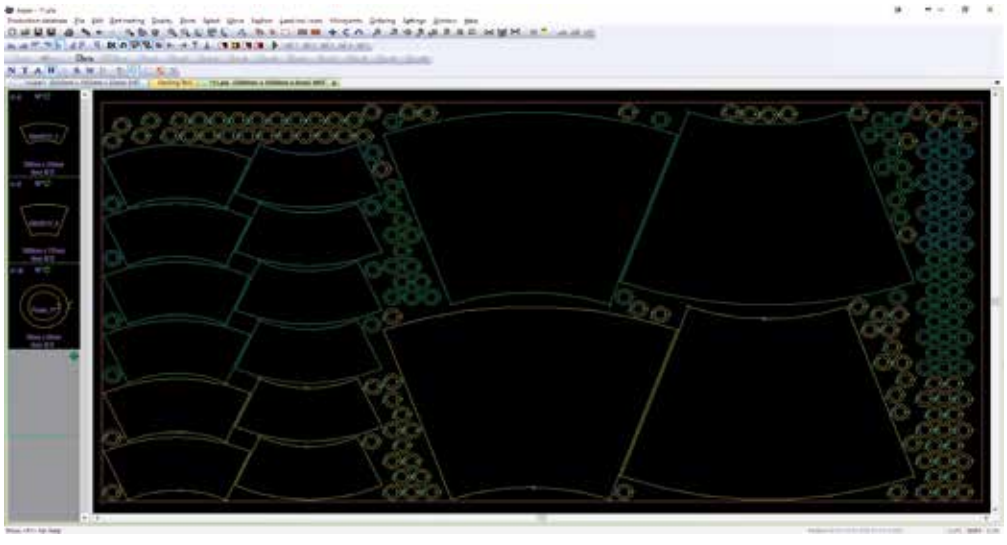
AsperWin® Basic

AsperWin Basic is the essential CAM module of MicroStep machines. It enables import of part drawings in DXF and other formats, provides interactive manual nesting functionality and automatic generation of NC code. 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.



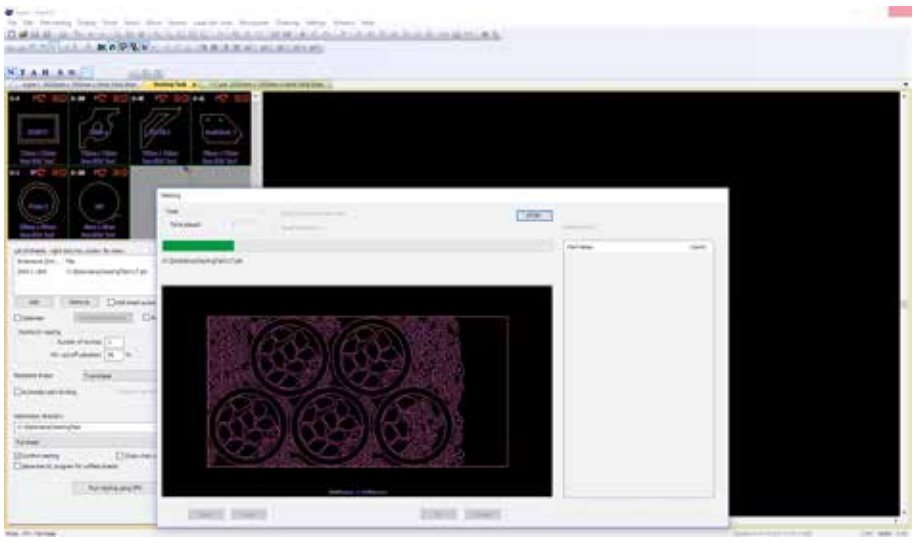
Multi-torch cutting

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).



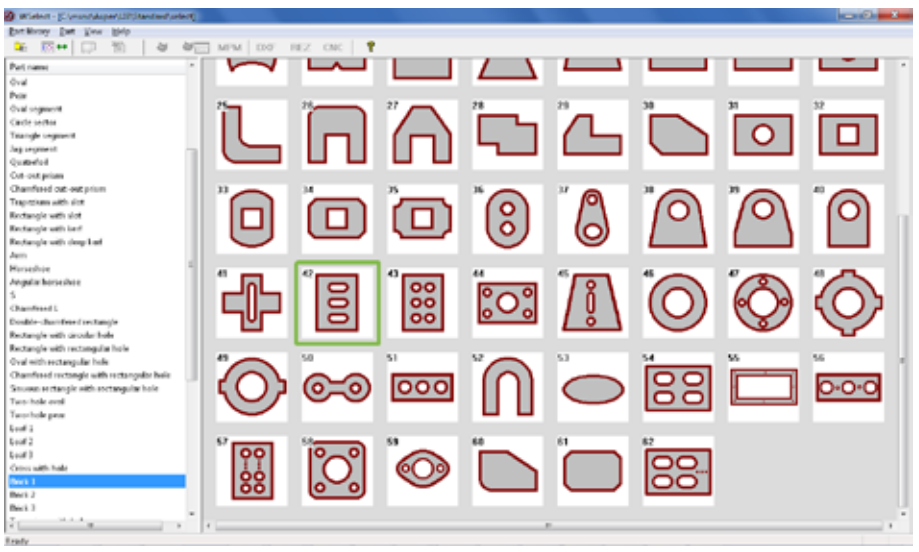
Automatic nesting

The automatic nesting module enables effective creation of nestings 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 on whole sheets while respecting defined criteria.
Current version of AsperWin enables the user to select a particular plate from his database to nest the parts on. The most notable new feature is the optional module Nesting Optimizer that is used mainly for getting improved overall utilization of the nested layout. Optimizer essentially runs number of trial nesting jobs and chooses the one that gives the best utilization, or allows the user to choose any of trial results.
Some of these trial runs change parameters such as rotation angle, nesting direction, whether and how specific parts are to be paired or the sequence in which these parts are nested, whereas other trial runs tweak the main nesting algorithm.



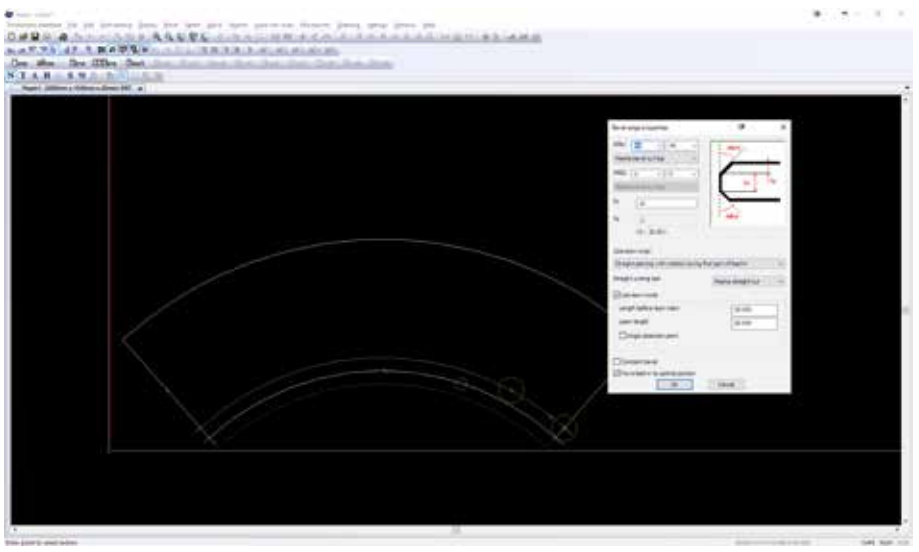
WSelect

AsperWin's default macro library contains an extensive collection of macros of adjustable standard shapes that can be exported to DXF or loaded directly into AsperWin for processing. It 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 a later quick import into Asper, without needing to use a CAD program. MicroStep is able to supply specific macros on customers' demand.



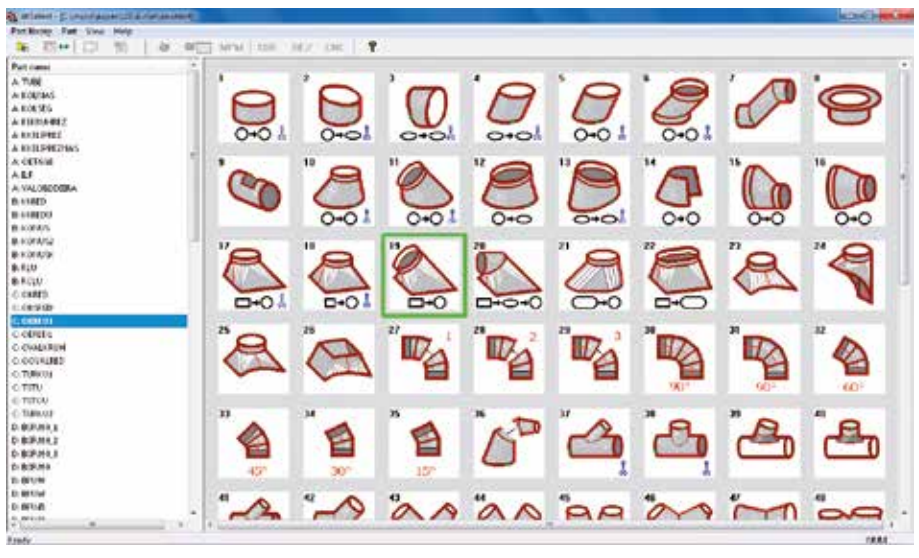
Bevel cutting

Bevel cutting module is used with beveling tool stations that can move in 5 axes: X, Y, Z, A (torch tilt) and B (rotation). The module supports 3 methods of starting a beveled 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.



AirSelect

Software module *AirSelect* for ductwork 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.

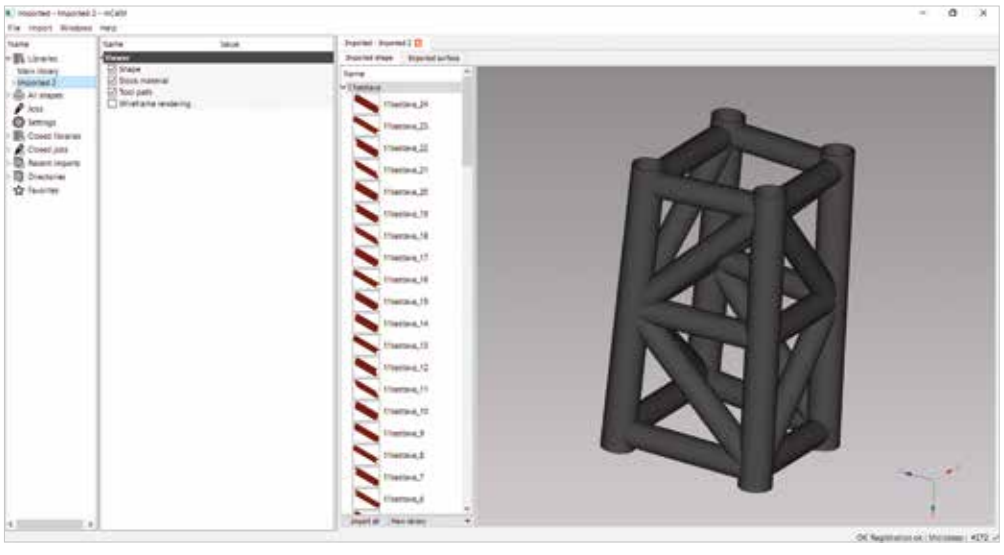


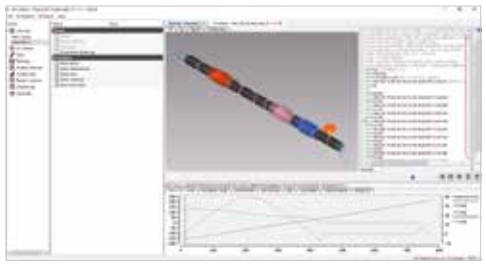
mCAM was developed within the project "Research of technology nodes on CNC machines for cutting of materials by energy-beam technologies" supported by the Ministry of Education, Science, Research and Sport of the Slovak Republic within incentives for research and development provided from the state budget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

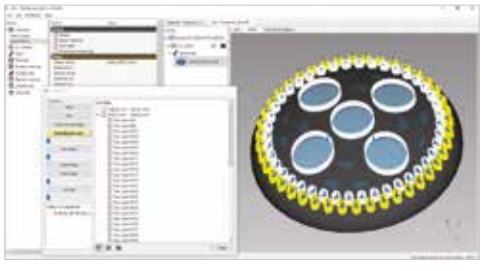
mCAM: 3D CAM for steel constructions

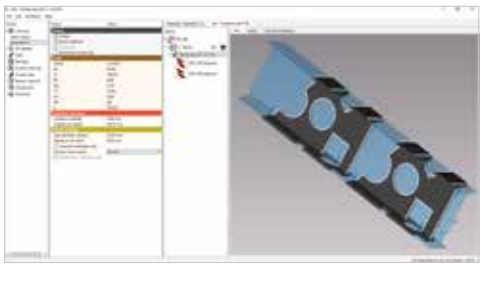
Massive expansion of 3D CAD systems over the last years has substantially influenced construction and preparation of production in mechanical engineering companies. This naturally resulted in a need of CNC machine programming based on 3D models of components. To address this need MicroStep took advantage of its 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. Among those are circular and rectangular pipes, H, I, U and L-beams, sphere segments and various types of domes – elliptical heads, cones, flat heads, inverted discs and others. mCAM allows users to import 3D solid models in commonly used STEP or IGES formats and automatically process all their elements according to the semi-product type. To achieve the highest utilization of material, mCAM can automatically nest all supported planar and 3D shapes on predetermined semi-products of different properties. A sophisticated algorithm rotates, mirrors, shifts, and organizes the parts to use the minimum amount of the stock material for a particular job. The user can then create cutting plans using various cutting parameters and choose from several types of lead-ins/-outs, add micro-joints, set transformation rules, use common cuts and many more. The software allows users to create libraries of frequently used parts, offers advanced visualizations, helpful previews and an embedded CNC simulator.

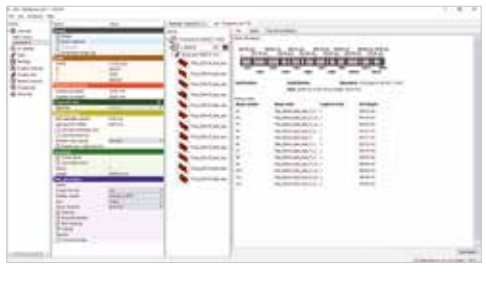
mCAM can be integrated with ERP systems such as MicroStep Production Management. This gives customers tools for maximum utilization of their production equipment. MPM creates cutting tasks for mCAM centrally, based on all incoming orders. mCAM then creates cutting plans and loads them to MPM's database. 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.

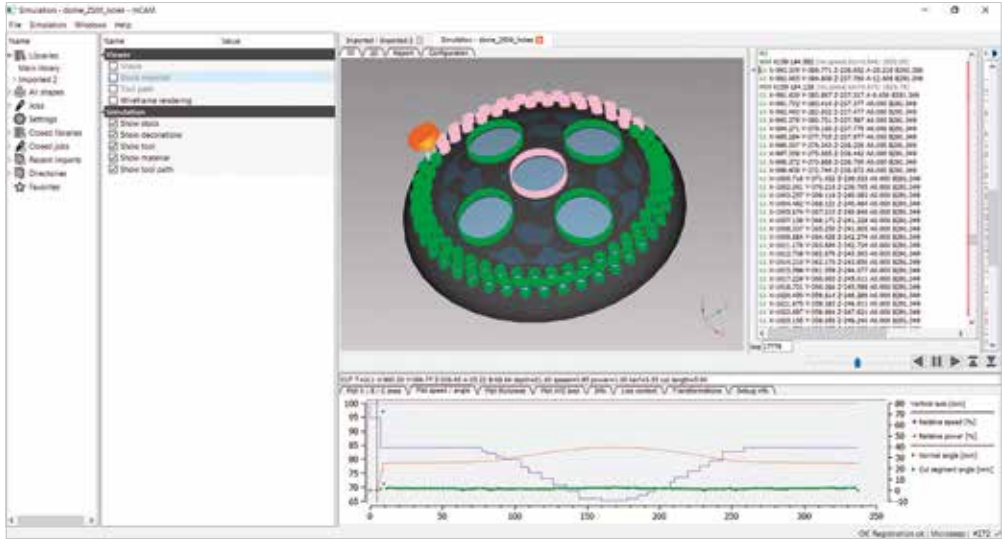








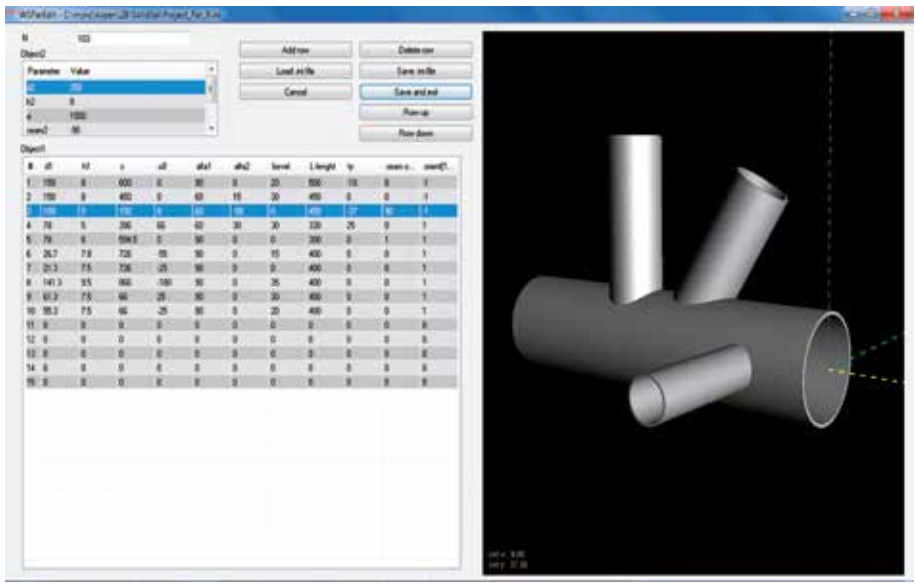




Macro libraries for 3D shapes

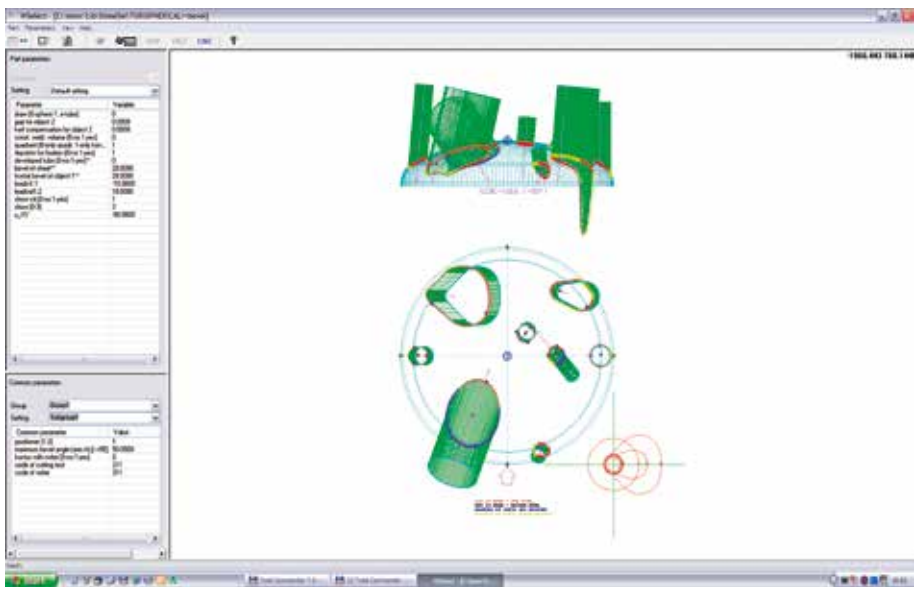
SolidSel

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 with other circular pipes, spherical and conical surfaces 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.
For more advanced applications where nesting is needed, an optional software module is available – a pipe nesting module of mCAM offered under the name mCAM PipeNest.



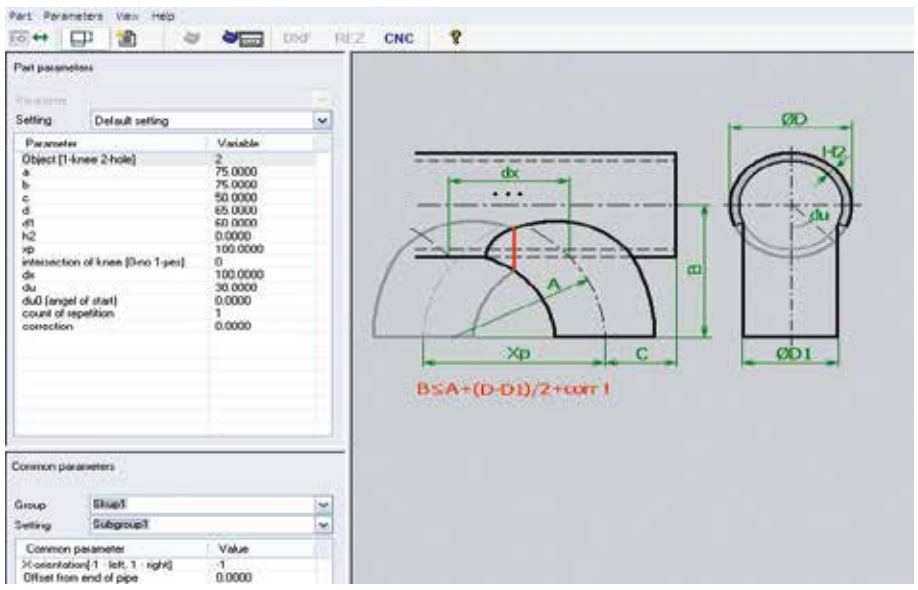
DomeSel

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 beveled 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.
Current versions of both SolidSel and PipeSel libraries come with enhance error location of errors, for cases when entered values clash with each other or with other parameters.



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.



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