

3D profiling

Forward-looking solutions for optimized processes





From a pioneer to an innovative problem solver in 3D cutting an welding

Innovative technologies, intelligent software, robust construction and modern design are the four cornerstones of our machine manufacture activities in Germany.

At our German Opladen and Erkelenz locations, we produce 3D profile cutting machines for round pipes, tanks, dished-ends, square & rectangular pipes and steel beams for the toughest requirements in the metalworking industry. The machines and our software solutions are used in all segments of thermal cutting and represent the first and the most important stage of a modern production process.

The high quality of workmanship and the many years of experience of our staff are an assurance of integrated solutions for complex cutting and weld-ing tasks – worldwide.

History

Müller Opladen is a tradition-steeped German engineering company that can look back on an almost century-long history since its founding in 1919. 2023 Müller Opladen was taken over by the Voortman company for strategic reasons.

Philosophy

Our philosophy is based on an understanding of our customers' needs and solutions geared to these requirements. This also entails serving our customers in a spirit of partnership throughout the life-cycle of our machines.

Research and development

In collaboration with our customers, our engineers in Germany and in the United States are constantly developing new solutions. Thanks to our extensive experience in the fields of CAD, software programming, developing electronic control systems, isometric projection and application-oriented cutting and welding processes, we can ensure that our technologies are always state-of-the-art.

Service

The over 1,000 machines at work each day in 72 countries demonstrate the reliability of our products. Our service centers in Germany, USA, Russia, the United Arab Emirates, India, Singapore and Brazil ensure direct communication and machine availability.



Assembly in Opladen



3D profile cutting machines

Since the construction of the first mechanical oxy-fuel pipe profile cutting machine with 3 axes in the early 1950s, it has since undergone consistent further development. Today, our machines equipped with up to 9 axes are capable of profiling round pipes, tanks and dished ends as well as square & rectangular pipes and beams. The machines of the current generation are equipped today above all with plasma cutting technology and efficient materials handling systems (logistics). Our software solutions for process planning and control relating to the cutting of various components and for data interchange between the machine and the CAD/CAM systems optimize the production process on the customer site on the principle of Industry 4.0.



Torch head of a pipe profile cutting machine



Tailor-made solutions for industrial sectors worldwide

You will find us wherever pipes, tanks, beams and other components for the metalworking industry have to be thermally three-dimensionally cut or welded. Owing to our leading position in the 3D pipe profiling machine segment, we serve customers on all five continents mainly in the following sectors:



Offshore plant construction: platform



Wind turbine construction



Steel construction

- Offshore plant construction
- Wind turbine construction
- Steel construction
- Mechanical contracting and process plant engineering
- Pressure vessel construction
- Shipbuilding
- General plant and equipment engineering

Listed below are some of our more than 1,000 reference customers in 72 countries.

Selected reference customers	Country
Aker Solutions	Norway
COOEC	China
Dragados	Mexiko, Spanien
Keppel Group	Singapur
Larsen & Toubro	Indien, Katar, Oman, Saudi Arabien, VAE
Saipem	Brazil, Canada, Congo, Italy, Nigeria
Sonamet	Angola, Nigeria
Techint	Brazil

Bilfinger Mars Offshore	Poland
Cimtas	Turkey
Dragados	Spain
Navacel	Spain
ST3	Poland
Steel Engineering	United Kingdom
Tata Steel	United Kingdom
Vitkovice Power	Czech Republic
Engineering	

Afcons	India
Cimolai	Italy, Venezuela
Cimtas Celik	Turkey
Eiffage Metal	France
Kurganstalmost	Russia
Stahlrohr	Germany
Unger Steel	Austria, UAE
Zamil Steel	Saudi Arabia

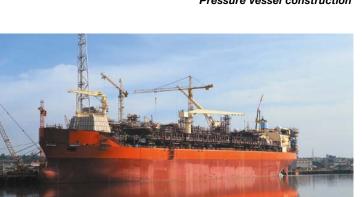




Mechanical contracting and process plant engineering



Pressure vessel construction



Shipbuilding



General plant and equipment engineering

Selected reference	Country
customers	
Alstom	Germany
Cairn	India
CB&I	USA
Enerfab	USA
GEA	Germany, USA
Piping Systems	USA
Ponticelli	France, Nigeria
Tranter	China, Germany, USA

Brask	USA
Chart Energy	USA
Eferest	Germany
Energy Weldfab	USA
North Shore	USA
Nuovo Pignone	Italy
Suncore	Canada
Vilmar	Romania

Bay Shipbuilding	USA
Cochin Shipyard	India
GSI	China
HDW	Germany
IHC Merwede	Netherlands
Nakilat	Qatar
Samsung	South Korea
Thoma-Sea	USA

Arcelor Mittal	Luxemburg
Bombardier	Germany
Bornemann Pumpen	Germany
Gottwald Port	Germany
Technology	
KSB	Germany
Siemens	Germany
Th. Witt Kältetechnik	Germany
Tyco Waters	Australia

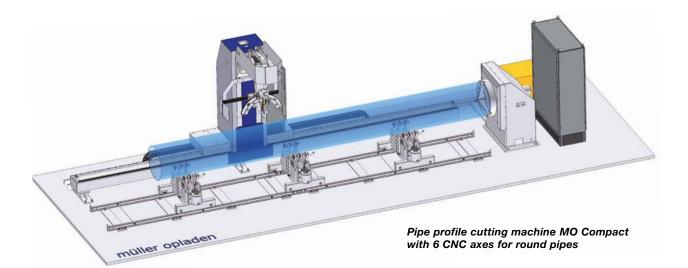


Complete product range for challenging 3D cutting tasks

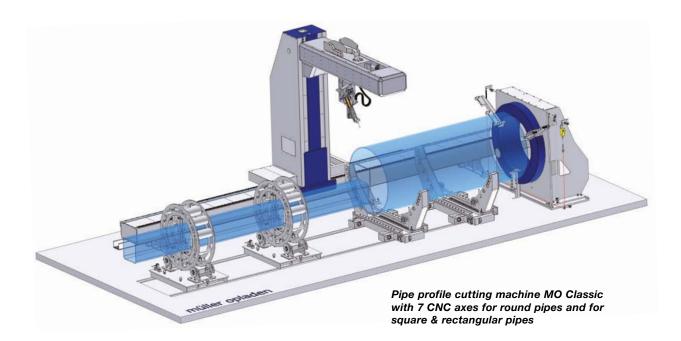
Our thermal 3D profile cutting machines are available in the MO Compact, MO Classic and MO Heavy-Duty.The machines of the MO Compact, MO Classic and MO Heavy-Duty series intended essentially for round pipes operate with macro-controlled or freely programmable software, so the machines can be programmed with already available cutting macros or with the aid of our CAD/CAM systems.

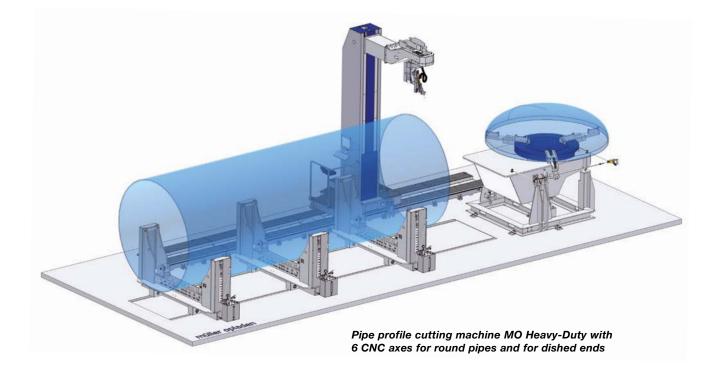
Plasma and oxy-fuel are available as cutting processes. The main differences between the various series can be seen from the table on the following pages. The CNC-axes of a pipe profile cutting machine can be as follows:

- 1. Rotation of the workpiece inside the chuck system (Y-axis)
- 2. Longitudinal movement of the cutting head along the workpiece axis (X-axis)
- Oscillatory movement of the cutting head (B-axis)
- 4. Rotation of the cutting head (C-axis)
- 5. Height adjustment of the cutting head by a measuring system in the event of surface deviations of the workpiece (Z-axis)
- 6. Torch distance correction in relation to the cutting angle during the cutting process (W-axis)*
- Transverse movement of the cutting head at 90° to the workpiece axis (V-axis)**
- Available for the MO Compact, MO Classic and MO Heavy-Duty series
- ** Available for the MO Classic series











Comparison of the main technical data of the MO Compact, MO Classic and MO Heavy-Duty

Technical data:	MO Compact			
Application fields:	Workshops/construction sites			
Transportability:	Transportable, stationary			
Maximum pipe length in mm:	12,000			
Maximum pipe weight in kg:	4,000			
Minimum cuttable pipe diameter in mm:	50			
Maximum cuttable pipe diameter in mm:	914			
Maximum load of pipe carriage in kg:	2,500			
Round pipe cuttability:	x			
Cuttability of cones:	<u>^</u>			
Square & rectangular pipe cuttability:				
Beam cuttability:				
Dished end cuttability:	-			
	-			
Cutting area behind chuck:	-			
Automatic workpiece logistics:	-			
Maximum number of CNC axes:	6 Other shoul			
Drive design of CNC axes:	Standard			
Pipe tracing:	Electromechanical			
Torch carriage track construction:	Column construction			
Mobile operator's platform:	-			
Height-adjustable operator's platform:	-			
Torch guidance system:	Azimuth torch head			
Oxy-fuel cutting:	X			
Maximum cuttable wall thickness, oxy-fuel, in mm:	60			
Maximum torch tilt angle, oxy-fuel, in °:	60			
Omniflow automatic gas control system:	-			
Plasma cutting:	X			
High-definition plasma cutting:	-			
Minimum cuttable wall thickness, plasma, in mm:	1			
Maximum cuttable wall thickness, plasma, in mm:	35			
Maximum torch tilt angle, plasma, in °:	45			
Machine/plasma system communication interface :	X			
Cutting angle correction:	X			
Start-position optimization:	X			
Joint compensation:	X			
Automatic piercing and piercing optimization:	X			
Library of standard cutting macros:	X			
Library of special cutting macros:	-			
Freely programmable software architecture:	-			
Work scheduling software:	X			
Nesting software:	X			
CAD/CAM software:	X			
Plasma marking system:	-			
Airscriber lettering and/or marking system:	X			
Inkjet lettering and/or marking system:	-			
Label printing system:	X			
* Applicable to machines with a pipe diameter of up to 1 220 mm				

* Applicable to machines with a pipe diameter of up to 1,220 mm

** Only applicable to machines with a pipe diameter of up to 2,032 mm



MO Classic	MO Heavy-Duty
Industry	Industry
Stationary	Stationary
24,000	24,000
20,000	40,000
50*/80	200
2,032	4,064
7,500	15,000
X	Х
Х	X
X	-
-	-
X	Х
X	Х
× ×	X**
7	6
High dynamics	High dynamics
Electromechanical, laser	Electromechanical, laser
Column or floor construction	Floor construction
X	X
	X MD taugh hood
MP torch head	MP torch head
X	X
150	180
70	70
X	X
X	X
X	X
1	1
80	80
45	45
X	X
X	X
X	X
x	х
X	X
Х	х
Х	x
X	х
X	X
X	X
X	X
X	x
× ×	X X
× *	× ×
× *	× ×
^	Λ



Cost effective compact systems for smaller pipes

The MO Compact series comprises standardized, compact machines with the key basic functions for round pipes up to a diameter of 914 mm and up to a pipe weight of up to 4 metric tons. The machines are all equipped with 6 CNC-controlled axes.

Detailed information can be supplied on request.

MO 400/6 Compact

with 6 CNC axes for round pipes with a maximum diameter of 406 mm inclusive of transport frame, Kjellberg PA-S45 W plasma cutting system, height-adjustable chuck and fixed-height pipe carriages





with 6 CNC axes for round pipes with a maximum diameter of 914 mm inclusive of the Hypertherm plasma cutting system, oxy-fuel cutting system, height-adjustable chuck, manual ball gutter and



Technical information / Machine series:	MO 400/6 Compact	MO 600/6 Compact	MO 800/6 Compact	MO 900/6 Compact
Weight of standard machine in kg:	4,500	5,000	5,500	6,000
Number of CNC axes:	6	6	6	6
Max. workpiece weight in kg:	4,000	4,000	4,000	4,000
Min max. clampable pipe diameter in mm:	50 - 406	50 - 610	50 - 812	50 - 914
Max. size of chuck opening in mm:	-	-	-	-
Min max. clampable square & rectangular pipe dimensions in mm:	-	-	-	-
Min max. clampable beam width in mm:	-	-	-	-
Min max. clampable diameter for dished ends in mm:	-	-	-	-
Min max. cuttable workpiece length in mm: *	300** - 12,000	300** - 12,000	300** - 12,000	300** - 12,000
Min max. wall thickness for cut- ting with oxy-fuel / plasma in mm:*	5-60 / 5-35	5-60 / 5-35	5-60 / 5-35	5-60 / 5-35
Max. torch angle with oxy-fuel / plasma in °: ***	+/- 60 / 45	+/- 60 / 45	+/- 60 / 45	+/- 60 / 45

* With torch in vertical position
 ** With additional clamping device up to 50 mm (depending on pipe parameters)
 *** Up to 55° when special plasma cutting sources are used











Unparalleled combination options for a huge range of workpieces

The MO Classic series covers our classical machines primarily for round pipes with a maximum diameter of up to 2,032 mm and up to a pipe weight of 20 metric tons. It is also suitable for square & rectangular pipes and dished ends. The maximum dimensions can be seen in the table of technical data. Thanks to numerous technical optional extras, these technologically complex machines can be individually adapted to customers' specific needs. The various machines of the MO Classic series can be equipped with up to 7 CNC axes. The 7th CNC axis is necessary for cutting square & rectangular pipes.

Detailed information can be supplied on request.

MO 600/6 Classic

with 6 CNC axes for round pipes with a maximum diameter of 610 mm inclusive of the Kjellberg HiFocus 360i plasma cutting system, oxy-fuel cutting system, stationary multi-point extraction system, height-adjustable chuck and fixed-height pipe carriage





MO 1200/7 Classic

with 7 CNC axes for round pipes with a maximum diameter of 1,220 mm and square & rectangular pipes of 420 mm x 420 mm maximum inclusive of the Kjellberg HiFocus 360i plasma cutting system, oxy-fuel cutting system, height-adjustable chuck and fixed-height pipe carriages

MO 1500/6 Classic

with 6 CNC axes for round pipes and dished ends with a maximum diameter of 1,524 mm inclusive of Hypertherm HPR 400XD plasma cutting system, oxy-fuel cutting system, stationary multi-point fume extractor, 7-nozzle inkjet lettering and marking system, and adjustable scissor-type pipe carriages



Technical information / Machine series:	MO 600/6 Classic	MO 1200/6 Classic	MO 1500/6 Classic	MO 2000/6 Classic
Weight of standard machine in kg:	7,000	9,000	11,000	13,000
Number of CNC axes:	6-7	6-7	6-7	6-7
Max. workpiece (round pipe) weight in kg:	12,000	12,000	15,000	20,000
Min max. clampable pipe diameter in mm:	50 - 610	50 - 1,220	80 - 1,524	80 - 2,032
Max. size of chuck opening in mm:	400	650	950	950
Min max. clampable square & rectangular pipe dimensions in mm:	100 x 100 / 240 x 240	100 x 100 / 420 x 420	100 x 100 / 640 x 640	100 x 100 / 640 x 640
Min max. clampable beam width in mm:	-	-	-	-
Min max. clampable diameter for dished ends in mm:	400 - 610	400 - 1,220	400 - 1,524	400 - 2,032
Min max. cuttable workpiece length in mm: *	300** - 24,000	300** - 24,000	300** - 24,000	300** - 24,000
Min max. wall thickness for cut- ting with oxy-fuel / plasma in mm: *	5-150 / 1-80	5-150 / 1-80	5-150 / 1-80	5-150 / 1-80
Max. torch angle with oxy-fuel / plasma in °: ***	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45

* With torch in vertical position
 ** With additional clamping device up to 50 mm (depending on pipe parameters)
 *** Up to 55° when special plasma cutting sources are used





Heavy-duty machines for large and heavy pipes

The MO Heavy-Duty series comprises machines for round pipes and/or dished ends with a maximum diameter of up to 4,064 mm and up to a pipe weight of 40 metric tons. The technology is based on that of the MO Classic series. Owing to the large workpiece dimensions and weights, the machines of this series have an extremely solid design. The machines are all equipped with 6 CNC-controlled axes. Detailed information can be supplied on request.



MO 4000/6 Heavy-Duty RD

with 6 CNC axes for round pipes and dished ends with a maximum diameter of 4,064 mm inclusive of Hypertherm HPR 400 plasma cutting system, oxy-fuel cutting system, height-adjustable operator stand, tilting chuck and hydraulic scissor-type pipe carriages





Technical information / Machine series:	MO 2000/6 Heavy-Duty	MO 2500/6 Heavy-Duty	MO 3000/6 Heavy-Duty	MO 4000/6 Heavy-Duty
Weight of standard machine in kg:	18,000	22,000	24,000	28,000
Number of CNC axes:	6	6	6	6
Max. workpiece (pipe) weight in kg:	40,000	40,000	40,000	40,000
Min max. clampable pipe diame- ter in mm:	200 - 2,032	200 - 2,540	200 - 3,048	200 - 4,064
Max. size of chuck opening in mm:	950	1,200	1,200	1,500
Min max. clampable square & rectangular pipe dimensions in mm:	-	-	-	-
Min max. clampable beam width in mm:	-	-	-	-
Min max. clampable diameter for dished ends in mm:	400 - 2,032	400 - 2,540	400 - 3,048	400 - 4,064
Min max. cuttable workpiece length in mm: *	300 - 24,000	300 - 24,000	300 - 24,000	300 - 24,000
Min max. wall thickness for cut- ting with oxy-fuel / plasma in mm: *	5-180 / 1-80	5-180 / 1-80	5-180 / 1-80	5-180 / 1-80
Max. torch angle with oxy-fuel / plasma in °:	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45	+/- 70 / 45

* With torch in vertical position



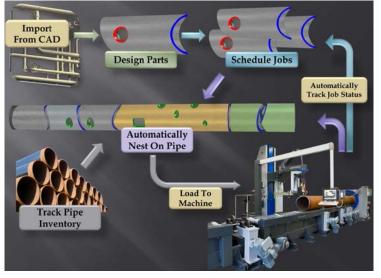


Comprehensive software support for process-oriented production

Our software solutions for machines and processes make our customers' production workflows more efficient. Our machines for the thermal cutting of 3D contours are not therefore isolated elements, but part of an integrated process chain.

With our CAM modules, we are able to link our machines to upstream and downstream workflows to significantly reduce production time, material costs and errors.

The software Corobs PLUS® and/or the macrobased Corobs® software are the basis for the MO Compact, MO Classic and MO Heavy-Duty machine series.



Example: CAD/CAM system

Corobs PLUS[®] CAD/CAM system for the MO Compact, MO Classic and MO Heavy-Duty machine series

Corobs PLUS[®] is a comprehensive CAD/CAM system for the purpose of modeling cutting geometries, for nesting numerous parts to be cut on a single pipe, for assigning cutting functions to one or several machines while taking into account their respective capacity, for keeping track of current working process stages at the machines and for calculating and recording cutting times and costs.

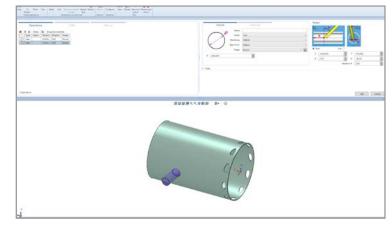
Corobs PLUS® also provides extensive reporting functions for calculation or documentation purposes. Furthermore, Corobs PLUS® provides comprehensive reporting for downstream costing and documentation purposes. Corobs PLUS® can be fully integrated in a company's workflow as an autonomous software system for the modeling of pipes or by importing drawings from a multitude of CAD software systems.

Corobs PLUS® offers rich data in SQL views that can be pulled into Excel and other tools for reporting, and into ERP systems or other databases. Corobs PLUS® is typically run at both the machine and in offices. In offices, CAD designers and detailers import jobs, design parts, and plan work. At the machine, machine operators nest parts on pipes and cut jobs.



Corobs PLUS[®] modeling module

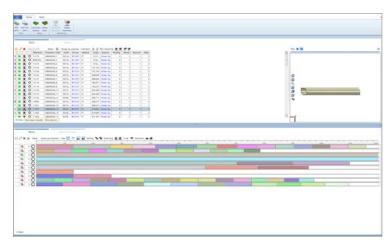
The Corobs PLUS[®] modeling module permits independent production of pipe cutting contours represented in 3D with dimension contours. To begin with, a cutting contour such as a saddle cut is selected. Then, only a few parameters need be entered into a pre-set mask to allow the cutting contour to develop automatically. Repetitive contours can simply be duplicated.



Example: modeling module

Corobs PLUS® CAD import module

Corobs PLUS[®] can import parts and complete design spools of most well-known software CAD systems such as Acorn, AutoDesk, Aveva, BoCAD, COMPRESS, Intergraph, Pro CAD, Pro Engineer, Ship Constructor, Solid Works or Tekla Structures. Custom importers for special CAD systems can be developed in cooperation with customers.

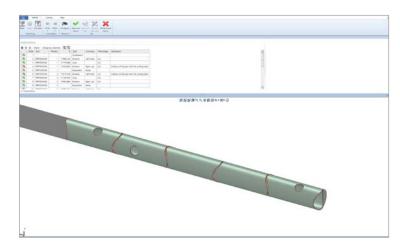


Example: CAD import module

Corobs PLUS[®] nesting module

Once all the parts have either been modeled or alternatively imported, Corobs PLUS®, with a single command, automatically nests the parts on a pipe. This algorithm for such optimal nesting can save up to 10 percent in materials. The pipe segments to be cut are then shown in 3D on the monitor.

During the cutting process, both the machine operator and those using Corobs PLUS® in offices can remotely see the machines' cutting progress. Corobs PLUS® integrates also software that can automatically print unique labels for each part.

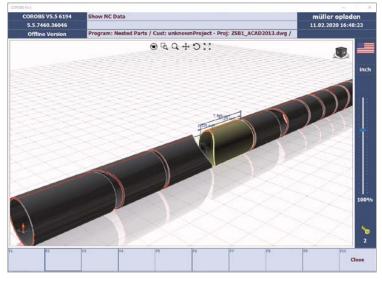


Example: nesting module



importStp	2										age 1 of 2 3/05/2023
Machine name Profile format Material		Muller Opladen 6MP / HPR 260 RO1325113 ST									
		Beam part			Loss			Parts list			
Reference	CNC	Quantity	Length	Weight	Length	Weight	%	#	Reference	Quantity	Lengti
Nestings10124-24	00279	1	12,000	5,047.52	5,980	2,515.35	49.83	1	BPRT000040	3	2,000
1					Loss						
	-	Muller Oplad									
Profile format	-	RO168*10 ST				Loss			P	arts list	
Profile forma Material	-	RO168*10	Length	Weight	Length	Loss Weight	%	#	P. Reference	arts list Quantity	Lengti
Profile format Material Reference	CNC	RO168*10 ST Beam part		Weight 468.46			% 74.31				Lengti 1,087
Machine nam Profile format Material Reference Nestings10/25-25	CNC	RO168*10 ST Beam part Quantity	Length		Length	Weight			Reference	Quantity	
Profile formal Material Reference Nestings/0/25-26	CNC 00230	RO168*10 ST Beam part Quantity 1	Length 12,000	468.43	Length	Weight			Reference	Quantity	
Profile format Material Reference Nestings10125-25	CNC 00230	R0168*10 ST Beam part Quantity 1 Muller Oplad R0194*7.1	Length 12,000 Loss	468.43	Length 8,918	Weight			Reference EPRT000039	Quantity	
Profile formal Material Reference Nestingsi0/25-26	CNC 00230	R0168*10 ST Beam part Quantity 1 Multer Oplad R0194*7.1 ST	Length 12,000 Loss	468.43	Length 8,918	Weight 348.13		1	Reference EPRT000039	Quantity 3	

Corobs PLUS® and SQL databases



Example: macro-based programming

Corobs PLUS[®] and SQL databases

Corobs PLUS[®] runs on top of SQL databases. These databases expose a rich set of data views for use in ERP, process management, inventory control, and custom reporting.

Our customers often integrate Corobs PLUS® data with their ERP system, and also with Microsoft Excel to create custom live reports for job costing, scheduling and tracking, inventory control, and post-job analyses.

 Corobs[®] macro-based programming for the MO Compact, MO Classic and MO Heavy-Duty machine series

Besides Corobs PLUS®, the machine computer also uses our Corobs® software. Through selection of a wide range of cutting macros, this allows quick preparation at the workstation of the various cuts which are then directly performed on the pipe.

Page 19 shows the standard cutting macros that are supplied in a library with each machine. Page 20 shows a selection of special macros that can be optionally included in the standard library in accordance with customer needs or the branch of industry concerned.

In addition to this, Corobs[®] offers various setting options with regard to cutting parameters and other sequential parameters with a view to optimizing the individual steps in each case and also depending on the properties and quality of the pipe. These functions are also provided by Corobs[®] when Corobs PLUS[®] is being used since the two software systems are interconnected and adapted to each other.



Ready made cutting macros for greater efficiency





Saddle 90° set-on concentric

Cut out 90°

set-on concentric

Saddle 90° set-in concentric

Cut out 90°

set-in concentric

Saddle double-miter 90°

Double-miter

Saddle 90° set-on eccentric



Saddle < 90° set-on concentric



Cut out < 90° set-on concentric



Saddle < 90° set-in concentric



Cut out $< 90^{\circ}$ set-in concentric



Slot concentric



Miter 90°



Saddle < 90° set-on eccentric

Cut out $< 90^{\circ}$ set-on eccentric



Saddle < 90° set-in eccentric



Cut out $< 90^{\circ}$ set-in eccentric



Slot eccentric



Miter < 90°

set-on eccentric



Saddle 90° set-in eccentric



Cut out 90°



Saddle double-miter < 90°



Double-miter

Cut out 90°





set-in eccentric





Examples of special macros for cutting profiles



Multiple saddle 90° concentric



Elbow saddle concentric



Offshore saddle concentric



Saddle 90° set-on concentric variable bevel



Cross cut-out eccentric square



Miter square & rectangular pipe



Miter beam



Multiple saddle 90° eccentric



Elbow saddle eccentric



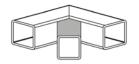
Offshore saddle eccentric



Saddle 90° set-on eccentric variable bevel



Cross cut-out eccentric angular









Notching beam



Multiple saddle < 90° eccentric



Elbow saddle offset eccentric



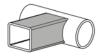
Dished end penetrations



Saddle < 90° set-on eccentric variable bevel



Miter < 90° for fractional fillet weld



Slots square & rectangular pipe Saddle square & rectangular pipe



Saddle beam



Double-miter beam

20





Miter 90° for fillet weld

Multiple saddle < 90° concentric

Elbow saddle offset concentric

Offshore miter







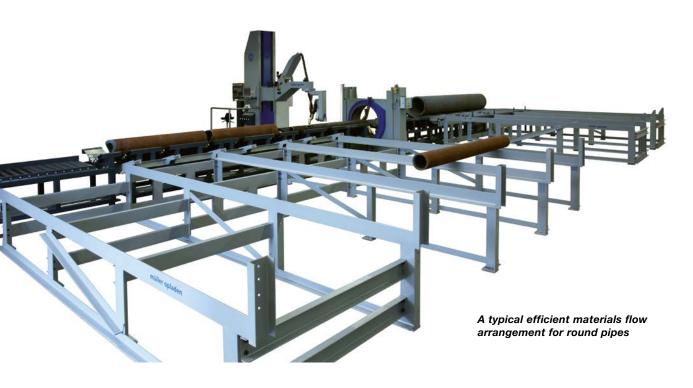






Process oriented pipe logistics for 20% higher productivity

The productivity of our machines is boosted considerably by automated workpiece handling with logistics integrated in the machine concept. The illustration below shows a typical materials flow for round pipes with a loading and off-loading table, a cutting conveyor and handling systems. The pipe is transferred from the loading table onto an infeed conveyor behind the chuck system. From here the pipe is pushed through the opening of the chuck onto the cutting conveyor in front of the chuck, where it is clamped and cut. Via an outfeed conveyor, the profiled pipe is then discharged onto the table in front of the machine, where it awaits further processing.





Example of a Watts Mueller cutting conveyor



In addition to the motorized roller bed solution, the machines can also be supplied with conventional pipe support carriages suitable for a maximum pipe diameter of up to 4,064 mm and a maximum pipe weight of up to 15 metric tons. If the pipe is placed on 2 carriages, the pipe can be displaced by the manual or motorized movement of the carriages. The support rollers of the pipe carriage can be manually or hydraulically adjusted to the pipe diameter with a scissor mechanism.

For a maximum pipe diameter of 610 mm and a maximum pipe weight of 2 metric tons, ball gutters can be used on which the pipe is then moved.





Motorized roller conveyor for pipes with a maximum diameter of 1,524 mm and a maximum weight of 15 metric tons

Motorized ball gutter



Manual ball gutter



Pipe carriages for pipes with a maximum diameter of 1,524 mm and a maximum weight of 15 metric tons. Pipe carriages with pneumatic drive

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