



**SPECIALIST
MACHINERY
SALES**

AUSTRALIA, NEW ZEALAND & SE ASIA

SUPERIOR KC 1221

3D PLASMA CUTTING AND COPING ROBOT



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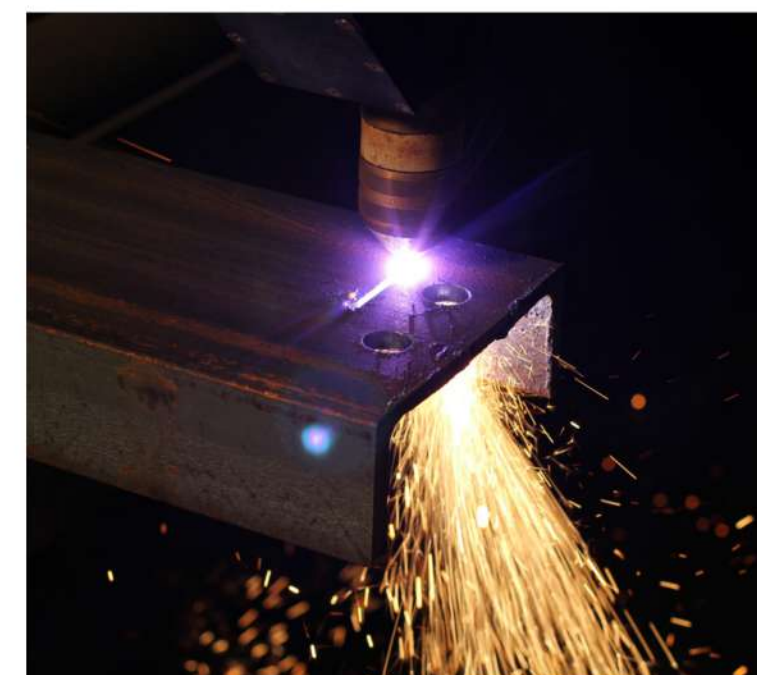
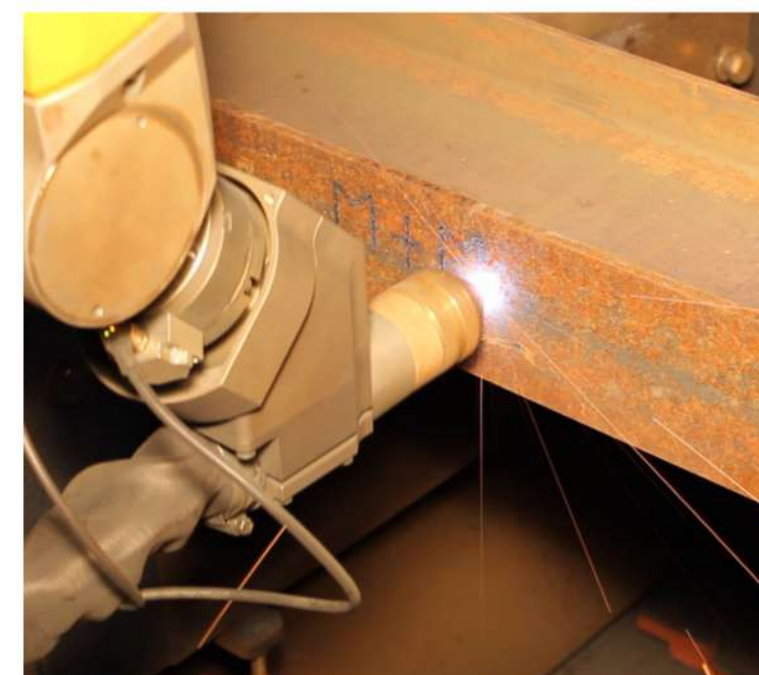
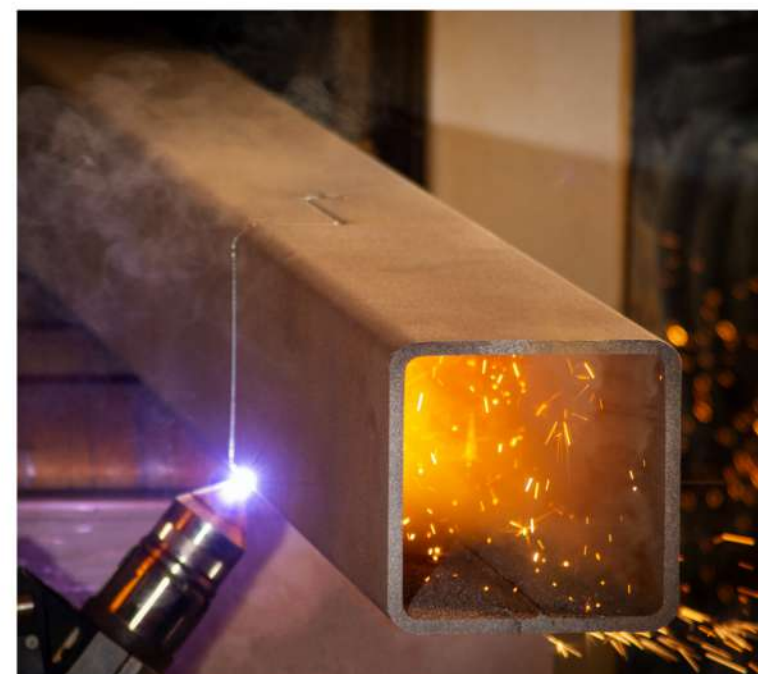


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AUTOMATED SOLUTIONS FOR EACH LEVEL OF REQUIREMENT

Many years of experience and high innovation rates enable us to set the standard in the industry, especially in the areas of sustainability and cost effective processing. As a trend setter and technology leader, we are able to supply premium quality solutions, combined with an attractive and functional machine design.

Our product ranges bring total solutions and special machines for sawing, drilling, plate processing, as well as shot blasting and painting, including logistic and control systems. Powerful, highly versatile systems, whereby quick return on investment is made possible by means of a high level of performance and productivity.

Process optimisation and a wide range of automation possibilities enable an individual adjustment of production and transport processes, according to your requirements. From unique machine software to complete management information systems, KALTENBACH will be your system supplier.

INTELLIGENT AUTOMATION POSSIBILITIES

- Creating valuable information on process optimisation
- Digital tracking and visualisation of material in production
- Complete management information on performance of the machine (uptime, energy consumption etc.)
- Pro-active information on need for service and spare parts
- Pro-active management of quality/material flow
- Automated infeed/outfeed, transport and storage

BENEFITS OF AUTOMATION

- Low staffing requirements up to low staffed shifts
- Faster material transport for higher tonnages
- Full transparency about material position and production progress



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WHY CHOOSE SMS?

Specialist Machinery Sales are the European machine tool builders, with more than 15 years of experience in supplying superior steel processing and structural steel machinery in Australia, New Zealand and Southeast Asia. **We offer FREE technical consultation, time studies, videos, 3D layouts and demonstrations.**

Partnering with a machine tool consultant with the pedigree to match your business' strategy, competitive positioning and ambitions can be challenging.

Not with SMS! The value of engaging SMS support and participation in the design process that creates a machine tool specification that **maximises value and ROI has been consistently achieved by our clients.**

[**LEARN MORE HERE**](#) ►





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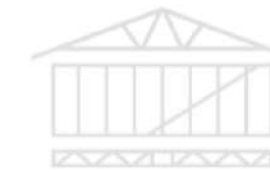
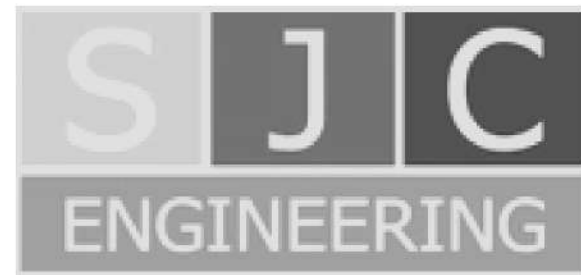
WHO PARTNERED WITH SMS?





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WHO PARTNERED WITH SMS?





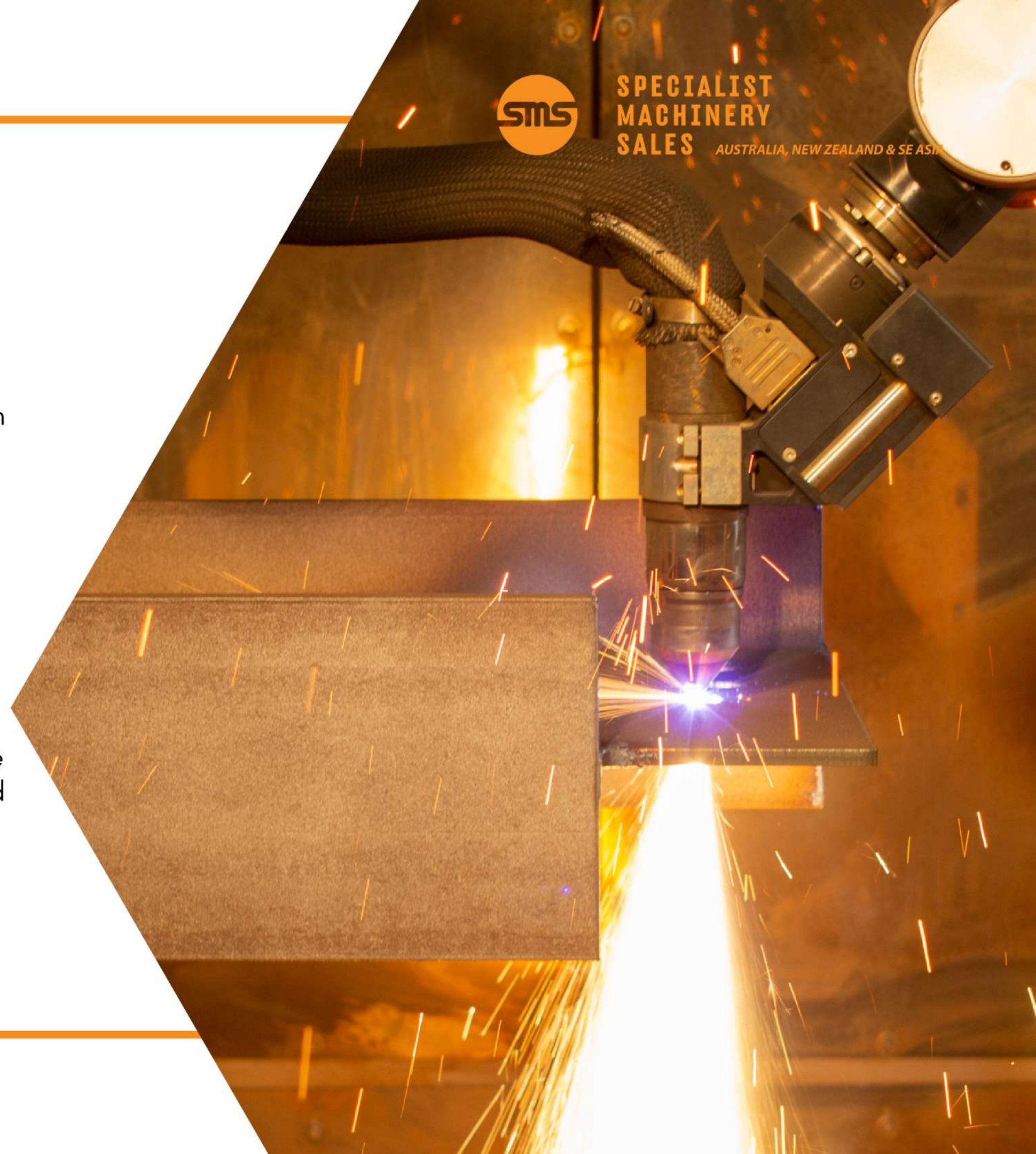
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HOW TO CHOOSE YOUR MACHINERY AND SYSTEMS PARTNER?

Specialist Machinery Sales (SMS) is a complete system and solution provider. SMS proudly offers the complete material handling to meet our client's material flow pain points and challenges; thus, innovating the traditional material flow of a fabricator's workshop-fabrication/assembly and welding out prior to shot blasting and painting. We are proud to be the only partner in Australia and New Zealand who can provide a complete system and integrate these machines from steel processing for all steel profiles and plate.

We partner with only the best and superior machine tool builders that have been market leaders of innovation and automation to the steel industry. We strongly believe that the future for our clients and the steel industry is to link the various machines and technologies, software, material handling, and automation together. This is now possible with a mix of new and pre-loved machines that can be integrated into the material handling ecosystem and footprint available when partnering with SMS.





INDUSTRY 4.0 CAPABILITY AND HOW WE CAN HELP YOU ACHIEVE SUCCESS WITH GOVERNMENT FUNDING

Specialist Machinery Sales details here recommendations for the effective delivery of your project based on agreed specifications and aspired outcomes. Clients investing in a Superior KC 1221 can benefit from the following expertise and relevant technological and competitive advantages:

- With over 135 years of accumulated know-how, Kaltenbach knows how to boost your efficiency and productivity. You will be assured of the right solution for any requirement. Unique coping robots with various cutting technologies perfectly adapted to your material and accuracy requirements. Consistent high quality, even with complex cutting processes. Modern software components enable simulations, feasibility tests and collision control.
- Traditional coping robots use point-to-point measurements while the KC 1221 performs a full 3D scan of the actual material shape, taking all deviations into account.
- No need for a traditional drill. Accurate plasma cuts and bolt holes are compliant with AISC and NEN 1090.
- Weld-preparation and ratholes without secondary processing are the new standard
- Kaltenbach's combined cut routine improves throughput time and minimises consumable usage and material waste.
- Save up to 40% in fit-up time per fitter by plasma layout and text marking to substantially reduce the overall throughput time.
- Kaltenbach is the only manufacturer that doesn't damage the web with full flange cuts by controlling the plasma current.
- Synchronisation between the robot and conveyor allows continuous cuts such as castellated beams to be performed in a single uninterrupted ignition.



INDUSTRY 4.0 CAPABILITY AND HOW WE CAN HELP YOU ACHIEVE SUCCESS WITH GOVERNMENT FUNDING

- The radius on box sections is often not equal to the theoretical model, nor are the sides. Kaltenbach's unique 360-degree laser scan technology follows the actual full circumference of the box section and compensates for deviations, providing the ability to maintain a constant torch to material distance. This results in accurate straight cuts and bevel capabilities on all sides of box sections, including the radius. Box sections are profiled in just two cuts, being more accurate and faster than the competition.
- End cuts on channels in a single run to save material, consumables and time.
- All add-on parts can be processed. Produce end plates, base plates and connection pieces from an angle, flat bar and plate.

- You can interpret 3D CAD models as freeform shapes without dependency on pre-defined cutting shapes or so-called macros. Easily import BIM files and integrate with MIS software to track down progress. Software is of paramount importance for the machine's performance, which differentiates Kaltenbach from the rest.
- Equipped with Industry 4.0 capabilities through full remote installation and virtual reality service. This ensures increased productivity and real-time efficiency for workshops transitioning to and embracing digitalisation from traditional to becoming a smart factory.

Clients of SMS increase their chances of winning government funding for a KC1221 and contracts from their customers compared with a traditional machine that cuts similar size profiles. Contact SMS today so the appropriate introduction to our preferred Government funding consultant that has a 95% success rate in securing funding for their clients will be able to assist you in your first step in automation.

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AUGMENTED REALITY SERVICE VIA SMART GLASSES

This augmented reality service – smart glasses can be used for decommissioning, recommissioning, training, and after sales support leading to faster and reliable support, reduce down time, and thus, better quality of service.

FEATURES AT A GLANCE

- Usage from virtual-reality-glasses
- Interactive guidance from our technician and customer
- Qualification distribution Highly qualified know how carriers at the help desk instruct less qualified operators on-site
- Better analysis of faults by assessing with your "own eyes"
- Support during the assembly, commissioning, service or repair process
- Hands-free work
- Smart phone app available



Smart Glasses in action

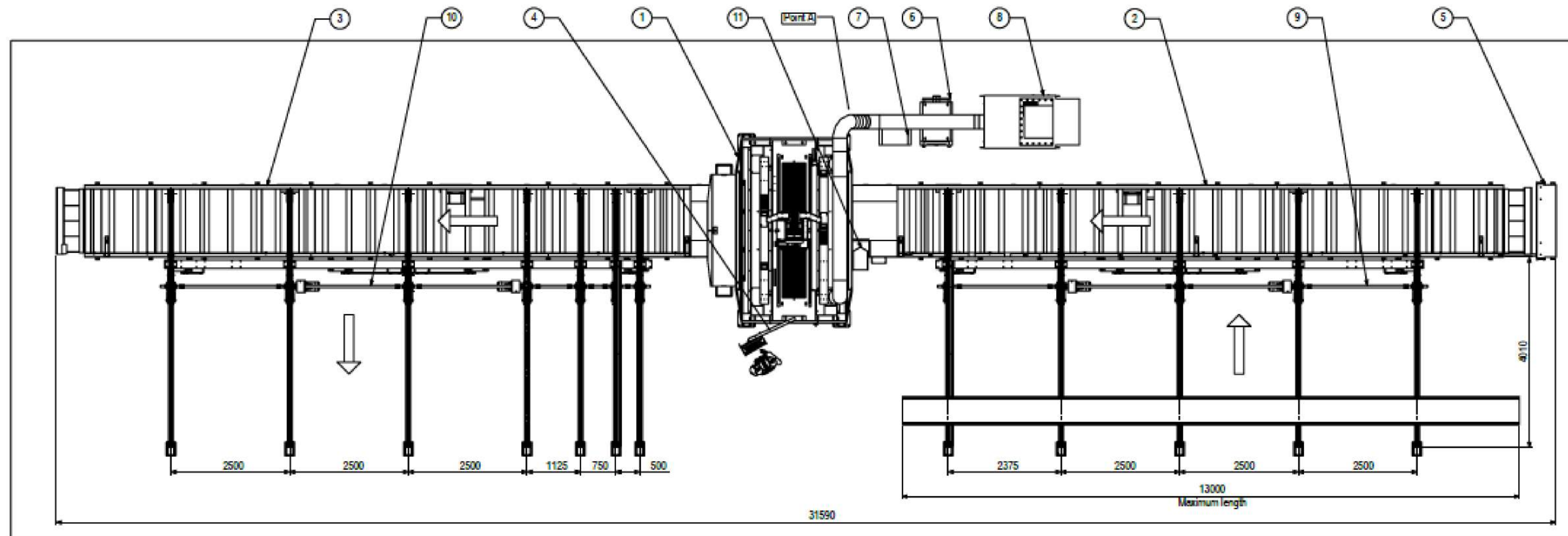


AUGMENTED REALITY SERVICE VIA SMART GLASSES

GLASSES	included installed RISE APP configured for connecting to supplier trial for 3 months / 4 hours transport cover / headset / charger can be used to all your machines in your workshop	3,500 €
SERVICE CONTRACT	4 hours each month not transferable Software license	450 € per month
PAY BY USE	1st hour / from second hour (invoicing from beginning of the quarter)	250 € / 180 €
RENTAL	1 month including 6 hours (maximum of 3 months)	1,000 €



MACHINE LAYOUT



- 1. Cutting Cell
- 2. Infeed roller conveyor 12m
- 3. Outfeed roller conveyor 12m

- 4. Remote control
- 5. Laser measurement system
- 6. HiFocus 280i

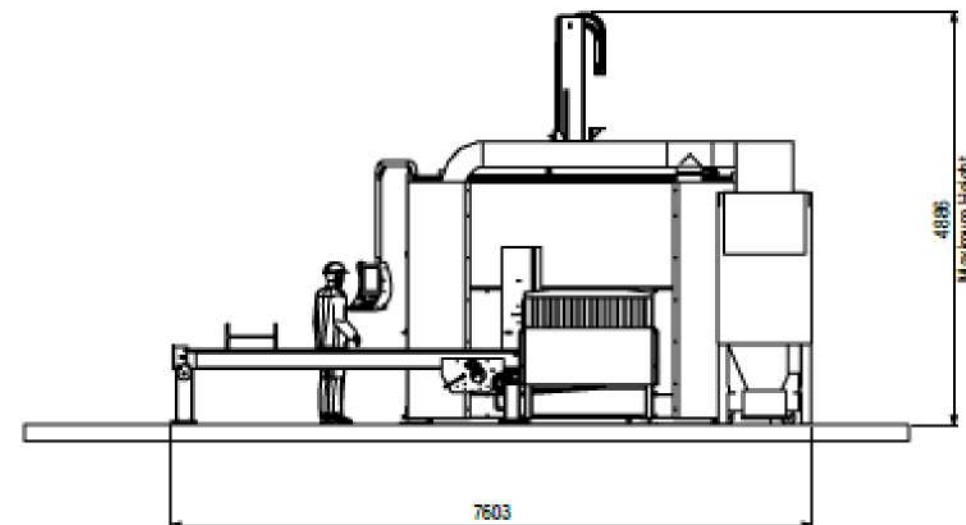
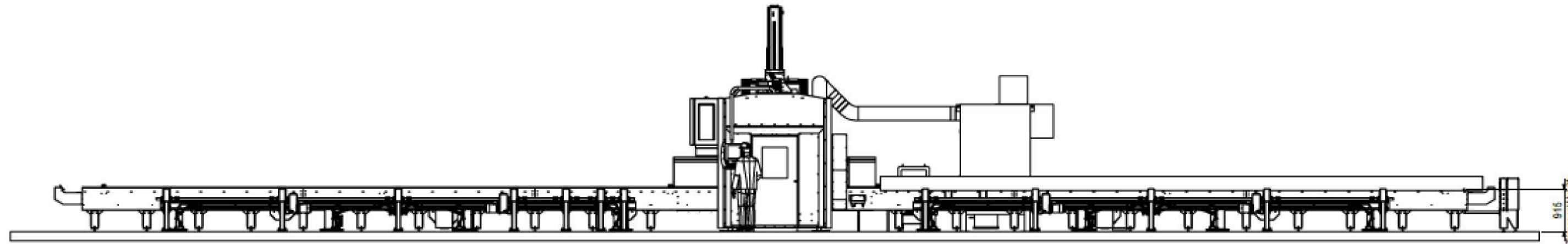
- 7. KWE 360 Colling Unit Plasma
- 8. (Optional) DFPRO 6
- 9. (Optional) Infeed chain conveyors

- 10. (Optional) Outfeed chain conveyors
- 11. (Optional) Punch marking unit



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MACHINE LAYOUT

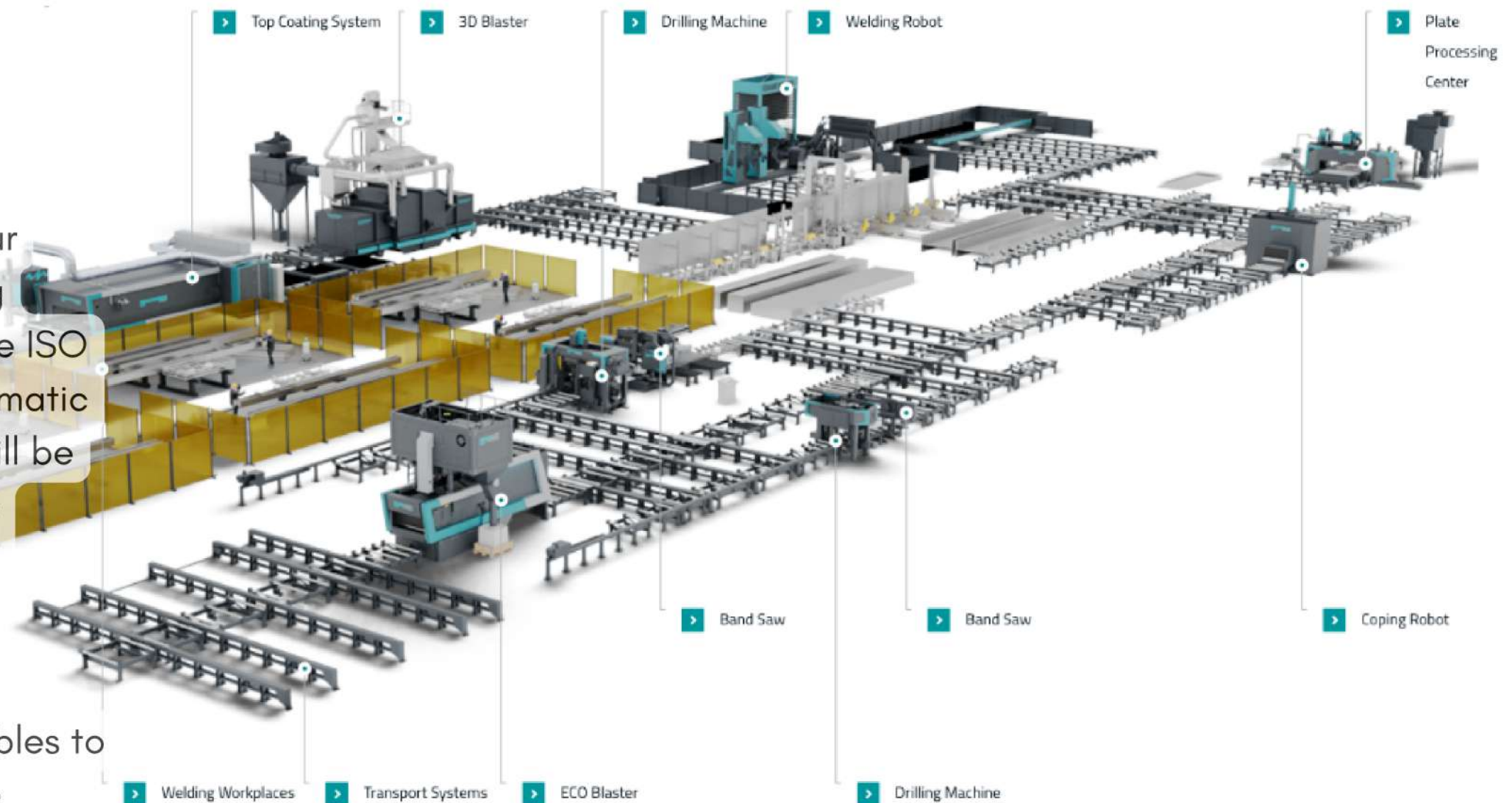




COMPLETE PRODUCTION LINE

All single parts will be accurately processed by our highly efficient sawing, drilling, milling and coping techniques. Pre-blasting material according to the ISO 1090 standard makes perfect welds with the automatic welding robot. Head, foot plates and stiffeners will be processed on the KF and can be positioned in the welding robot, by the robotic assembling device.

With the post blaster, you will produce welded constructions with a perfectly cleaned surface, according to ISO 8501:2007. The 3D scanner enables to paint a lot of parts automatically. With the unique KALTENBACH production software, it is possible to control the machines with a minimum number of operators.



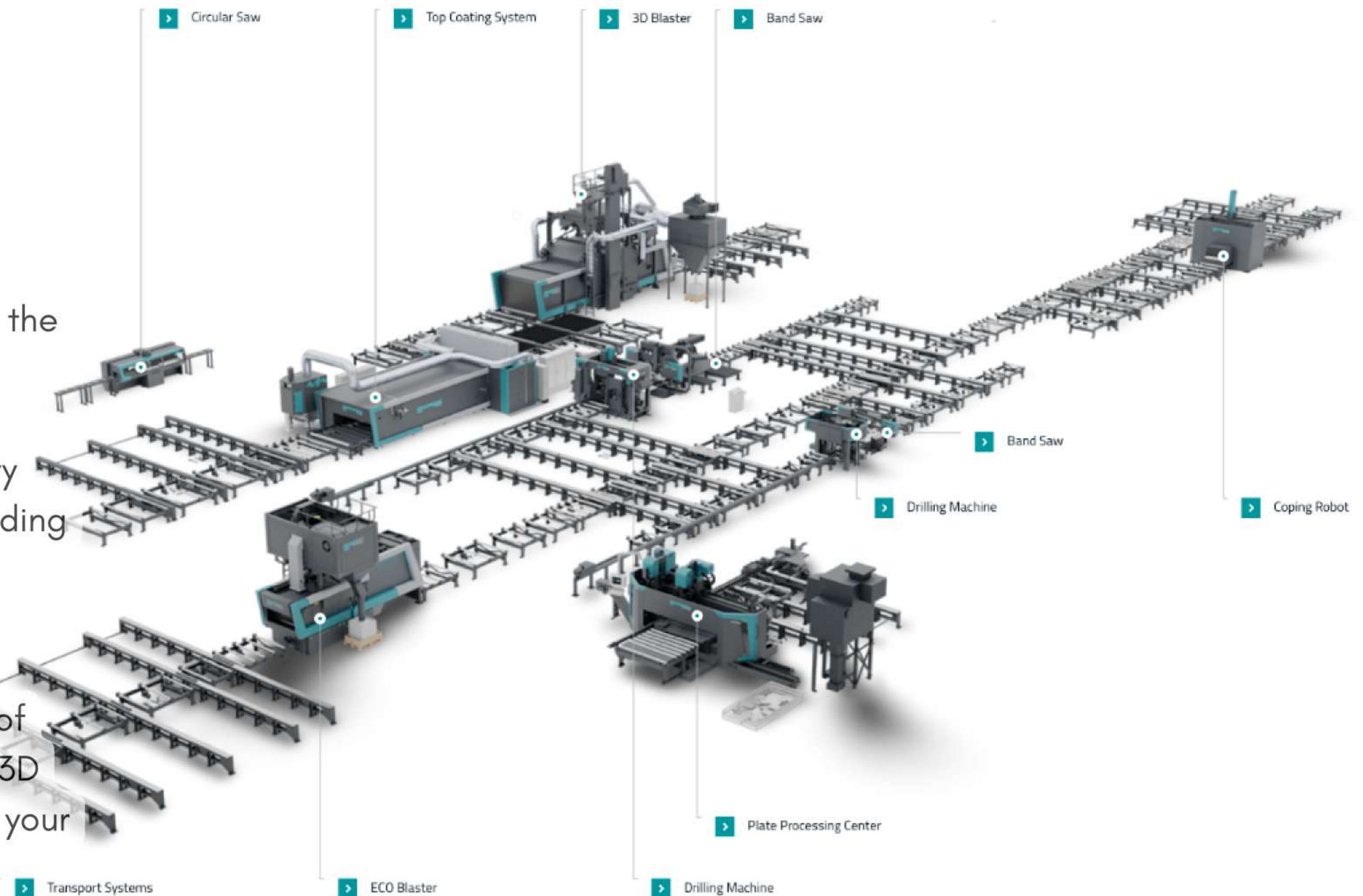


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SAMPLE LAYOUT FOR STRUCTURAL FABRICATION

Via importing the CAD, DSTV+ files into PROFILINE, the transition will be made to start the production. Sophisticated processes, such as sawing, drilling, milling, cutting and coping, will result in high-quality parts. Perfectly cleaned for manual welding, according to the ISO1090 standard.

After welding, the complete constructions can be blasted and painted fully automatically, by means of the GIETART 3D Blaster and Top Coating line, incl. 3D Scanner. This integrated system enables to reduce your internal logistic and handling costs considerably.





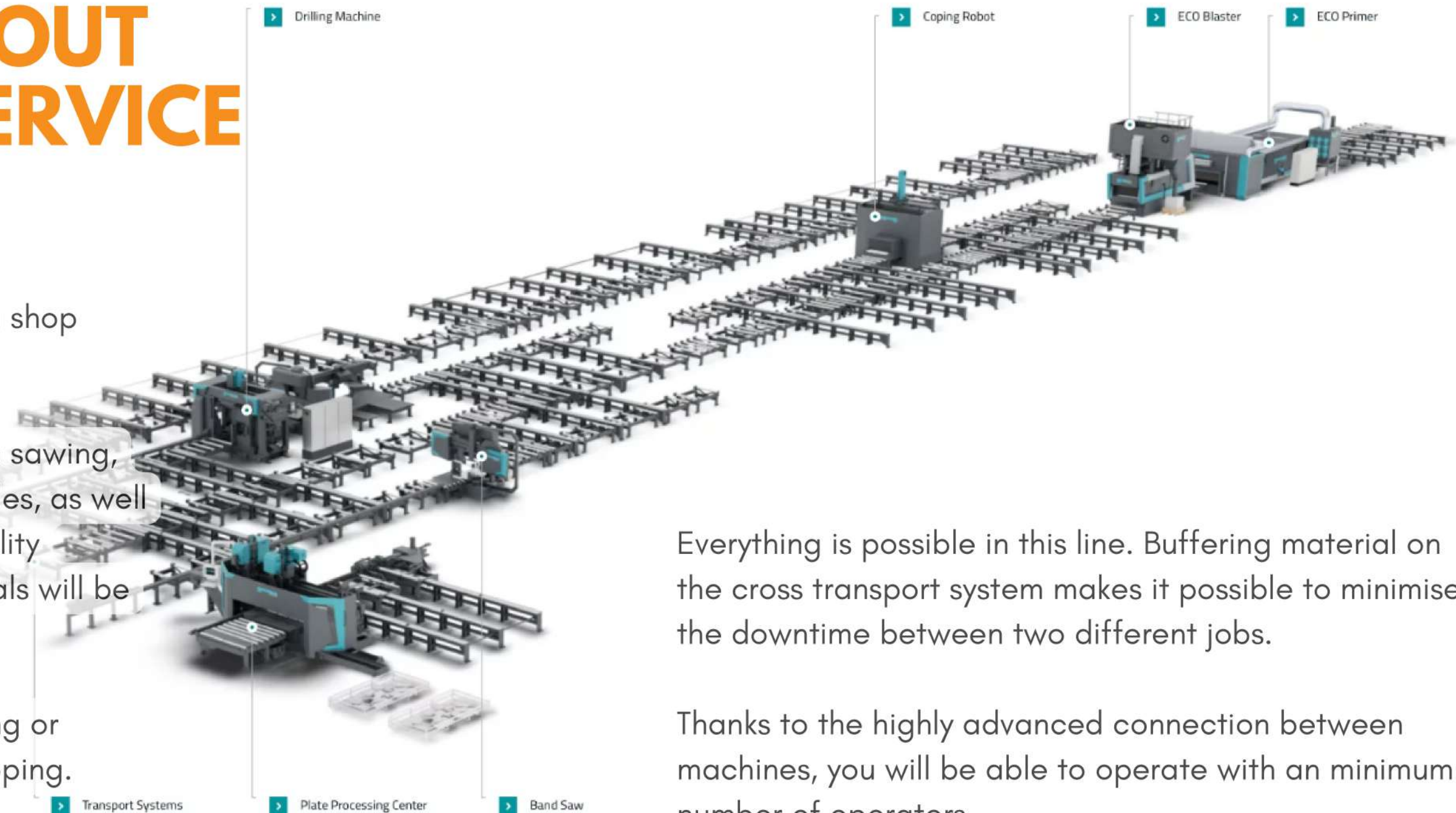
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SAMPLE LAYOUT FOR STEEL SERVICE CENTRE

Are your customers searching for a shop where all parts will be prepared?

With this line, you are the master in sawing, drilling, milling and coping of profiles, as well as processing plates with high quality machinery. Afterwards, the materials will be shot blasted and painted.

Preparing holes till 50 mm by drilling or making larger ones by milling or coping.



Everything is possible in this line. Buffering material on the cross transport system makes it possible to minimise the downtime between two different jobs.

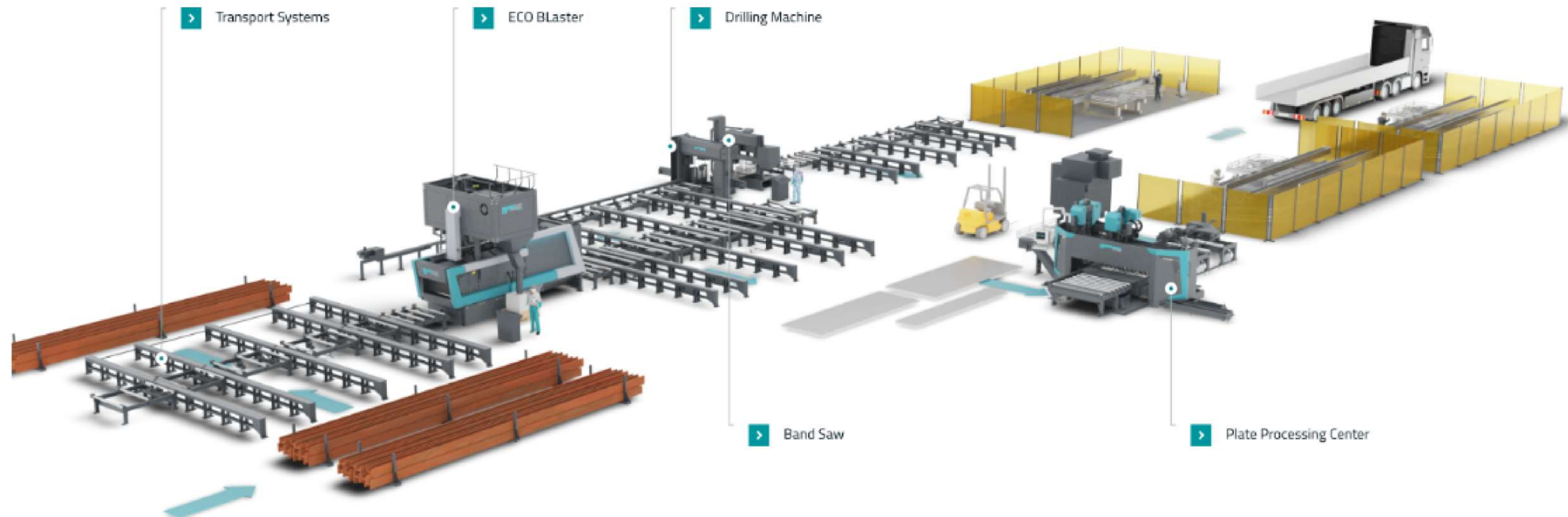
Thanks to the highly advanced connection between machines, you will be able to operate with an minimum number of operators.



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COMPLEMENTARY MACHINES

SAMPLE 1 - BEAM LINES (PRE-LOVED OR NEW SAWING AND DRILLING)

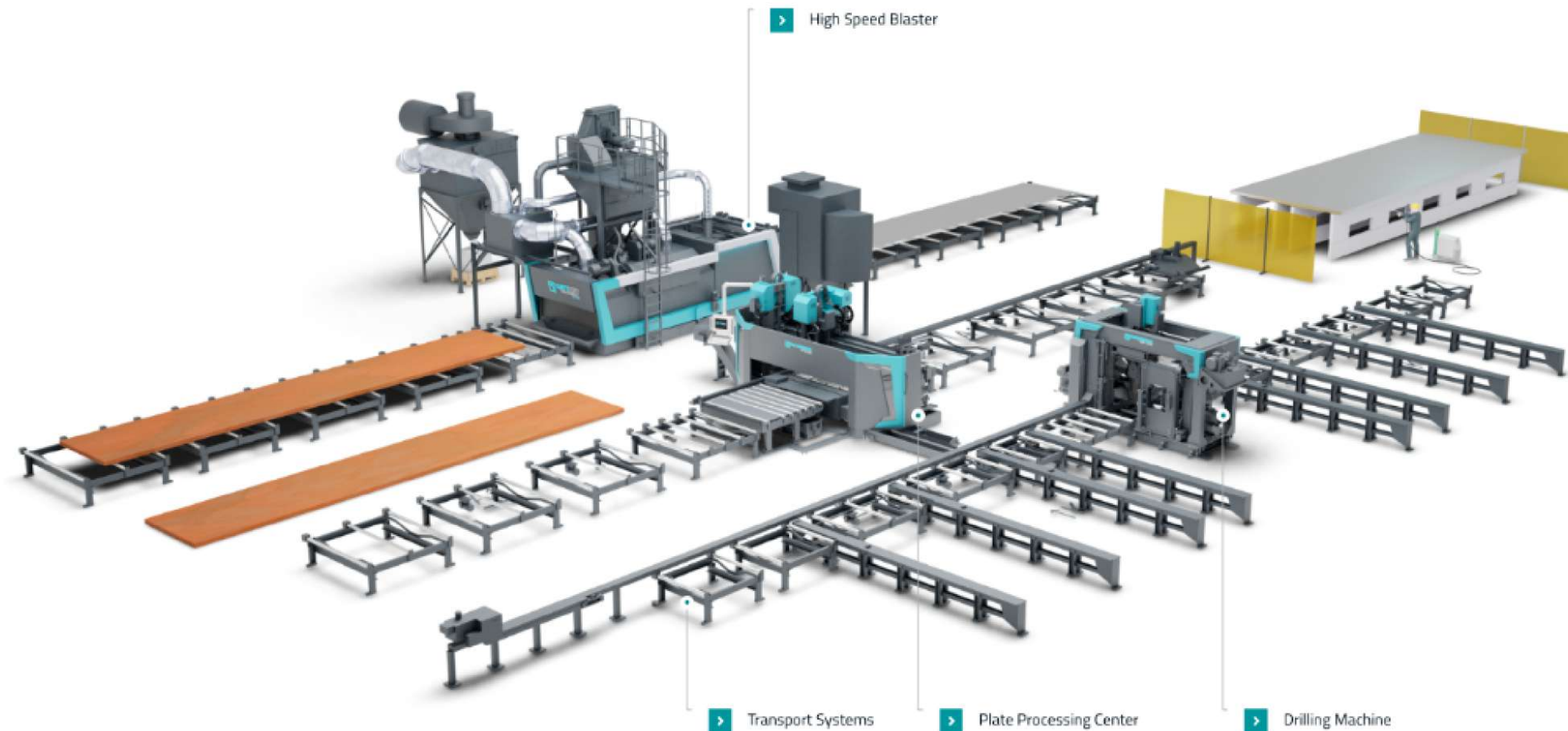




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COMPLEMENTARY MACHINES

SAMPLE 2 - SHOTBLASTING AND PAINTING SYSTEMS (PRE-LOVED OR NEW)



SUPERIOR KC 1221

3D PLASMA CUTTING AND COPING ROBOT

The SUPERIOR KC 1221 is a robust, high-performance coping robot which offers you total processing freedom. You can import any contours from CAD programs using DSTV or STEP without being limited by macros. Or alternatively, use macros to program parts quickly and nest them easily. The system is designed to minimise material consumption and burner wear at all times. Intelligent sensors detect material displacement, distortion and deformation in seconds and automatically correct the cutting path to ensure optimum precision and exceptional cutting quality.

Outstanding cutting results can be obtained at high cutting speeds with Kjellberg HiFocus 280i neo and 440i neo plasma cutting units. Low-noise technology and long service lives for wearing parts makes Kjellberg the ideal partner. In addition, training opportunities before and after commissioning ensure that operators are highly qualified as well as providing a smooth production start-up and a rapid return on investment.



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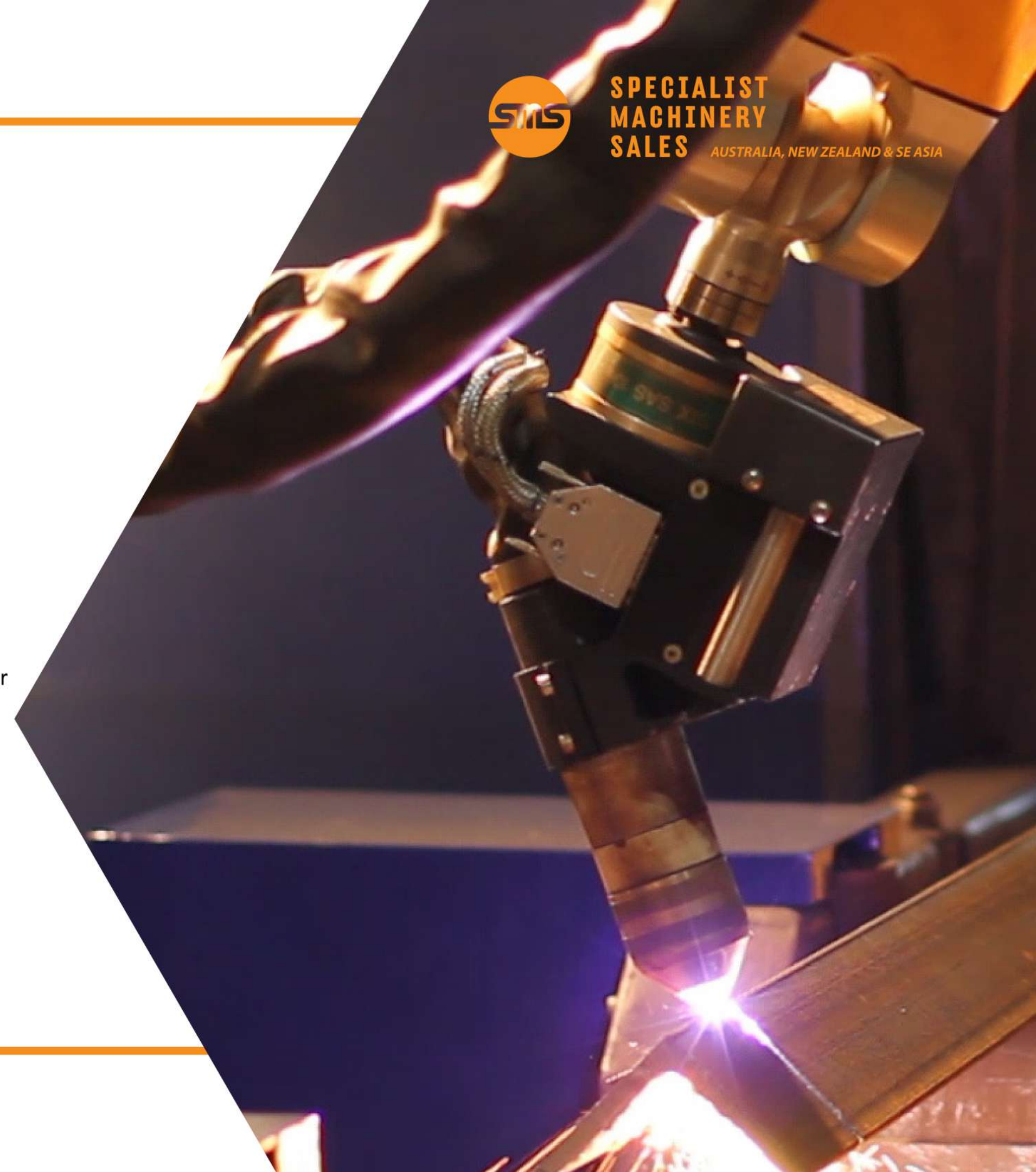
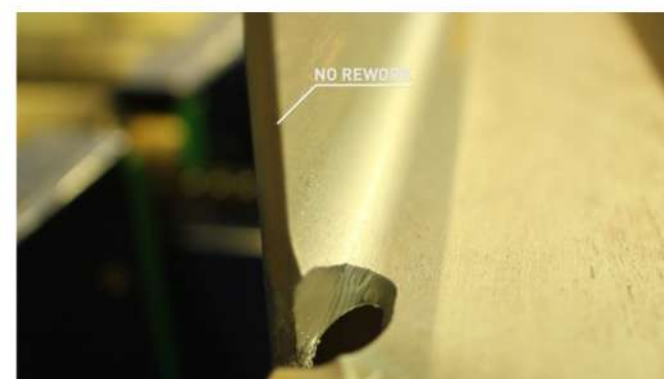


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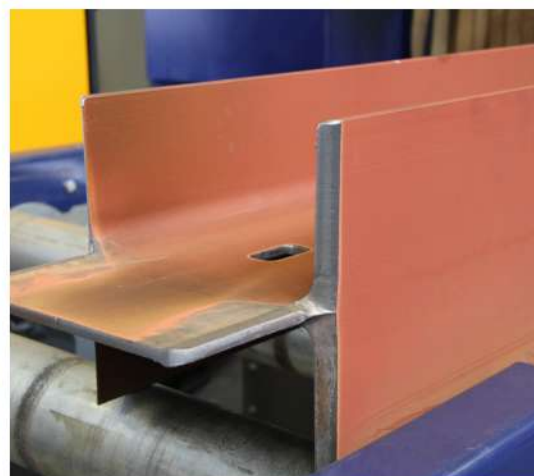
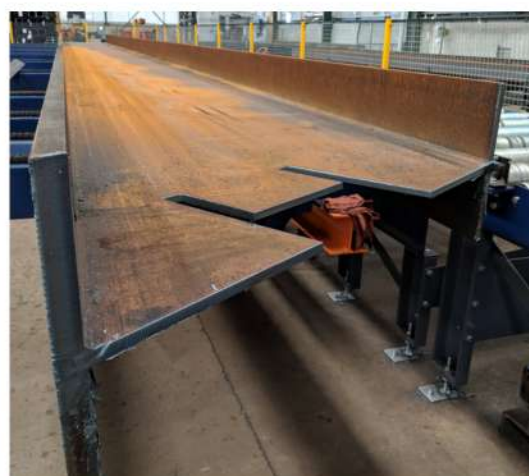
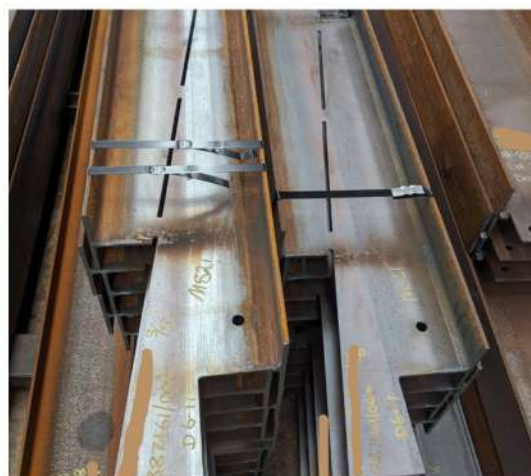
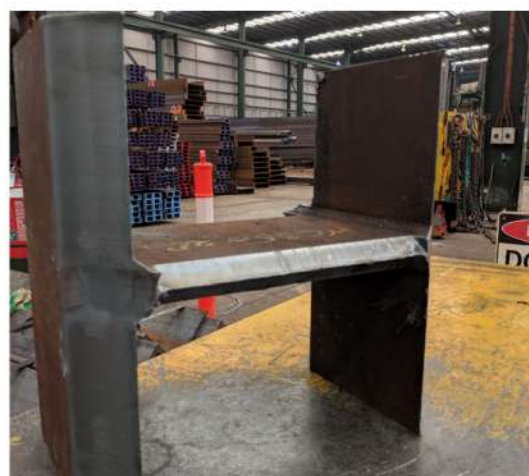
ADVANTAGES AT A GLANCE

- Most “high-tech” and accurate plasma beam cutting machine in the industry due to intelligent software and scanning technology
- Least amount of rework effort in terms of grinding and weld preparation
- Freedom to design and freedom to fabricate with user friendly ProCAM software. No limitations like macros.
- Compatible with industry 4.0 and CAD file formats like DSTV as well as STEP or MRP/ERP software
- 4-sided marking and cutting of structural steel
- Efficient nesting and cutting path generation for high speed and low wear
- PerfectHole Technology for cutting bolt holes and others





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TECHNICAL DATA

SUPERIOR KC 1221

- Cutting cell
- Roller conveyors
- Industrial robot

CONTROL UNIT

- Motion control supplier: B&R
- Electronics and motors supplier: B&R
- Remote bus IO supplier: B&R
- Equipped with air conditioning
- Network interface
- Computer: Industrial PC with SSD drive

OPERATOR DISPLAY CONTROLS

- Touch screen
- Industrial keyboard
- USB drive for the purpose of loading files

ENVIRONMENT

- Admissible ambient temperature:
- Metric 5°C/40°C
- Exceptions on request

MATERIAL CAPACITY

Minimum infeed material length for automatic cutting

2.400 MM

Minimum infeed material length for the chain conveyor

3.000 MM

Minimum outfeed material length for the chain conveyor (except last part)

900 MM

Maximum material length (any length possible, extensions in increments of 2 metres)

12 M

Minimum material weight for automatic infeed

20 KG/M

Maximum material weight per meter/foot

1.000 KG/M

Maximum material weight total

12.000 KG



TECHNICAL DATA

TARGET PLATES

- A magnetic plate attached to the end of the material provides an easy target for the laser which will increase productivity.
- A target plate should always be used when the distance from the conveyor rollers to the top of the profile when loaded is less than 40 mm (e.g. flat bars, bulbs).

CUTTING HOLES

- Minimum hole diameter depends on the wall thickness (t):
- ≤ 5 mm = not possible
- 5-10 mm = $2 * t$
- 10-15 mm = $1.5 * t$
- 15-40 mm = $1 * t$
- ≥ 40 mm = not depending on t

WEB CUTTING

- Web cuts close to the flange need an offset and may leave a stump in cases where the flange must remain intact. The minimum stump height from the flange is 15 mm.
- A conventional rathole needs the same minimum offset of 15 mm. Use Kaltenbach's special ratholes to avoid minimum offset and remove the need of rework.

LASER SCAN SURFACES

DETECTABLE SURFACES												
WALL THICKNESS	PROFILE LENGTH 12 - 14 METERS				PROFILE LENGTH 16 METERS				PROFILE LENGTH 18 METERS			
	1	2	3	4	1	2	3	4	1	2	3	4
SURFACE DEFINITION												
5 MM	•				•				•			
8 MM	•	•	•	•	•				•			
10 MM	•	•	•	•	•	•	•	•	•	•	•	
>10 MM	•	•	•	•	•	•	•	•	•	•	•	

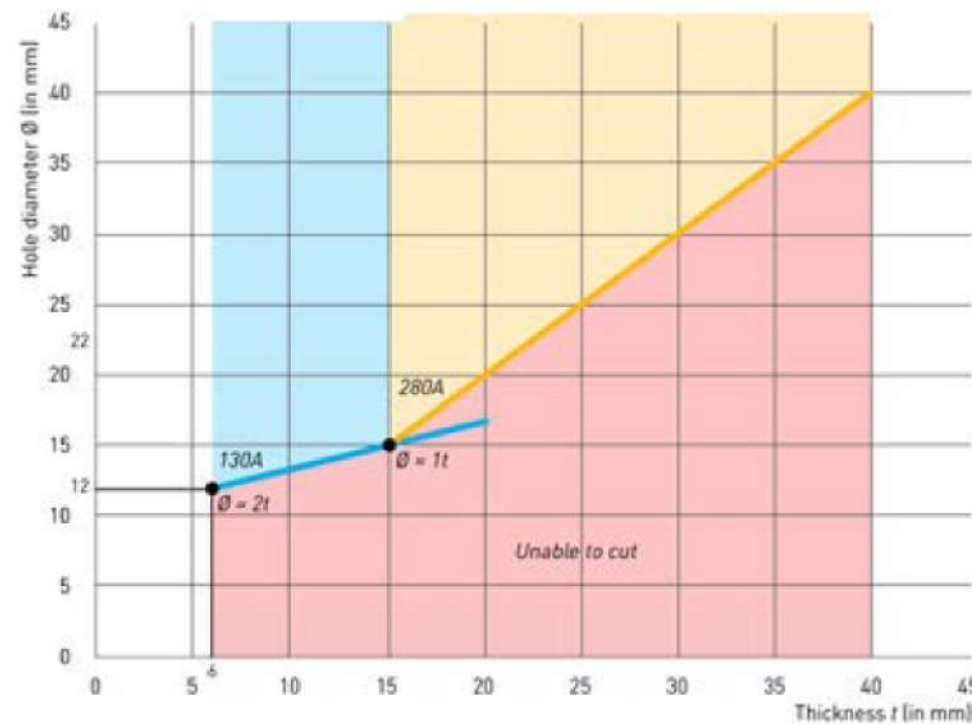
Definitions of surfaces that can be measured in relation to distance and wall thickness:

1. Target plate: a magnetic plate that is attached to the end of the beam or profile.
2. Clean saw cut: a clean, straight cut that is free from rust.
3. White paint: a straight flat surface with paint.
4. Rusty: a straight but rusty flat surface.



TECHNICAL DATA

CUTTING HOLES



PLASMA CUTTING (MILD STEEL)

PLASMA UNIT	MAX. CUTTING LENGTH(1)	MIN. WALL THICKNESS	MAX. WALL THICKNESS FOR PIERCING	MAX. BEVEL ANGLE
HiFocus 280i neo	50 - 70 MM	5 MM(2)	40 MM	45°
HiFocus 440i neo	80 - 120 MM	5 MM(2)	50 MM(3)	45°
Hypertherm XPR 170	40-6	3 MM(2)	40 MM	45°
Hypertherm XPR 300	60-80	3 MM(2)	50 MM(3)	45°

1. This column represents the cutting length ranges 'maximum high quality cutting length' to 'maximum cutting length'. Values are dependent on the material to be cut, its composition and the cutting speed. It is not related to the maximum wall thickness for piercing.
2. Data is according to Kjellberg and Hypertherm documentation. Kaltenbach guarantees quality at 6 mm minimum wall thickness.
3. Data is according to Kjellberg and Hypertherm documentation. Kaltenbach guarantees quality up to 40 mm maximum wall thickness.



TECHNICAL SPECIFICATIONS

WORKING RANGE	WIDTH X HEIGHT MAX. MATERIAL LENGTH	1220 X 430 MM 18 MM
BEVELING ANGLE	MAX. ANGLE	45°
COMPRESSED AIR	CONNECTION BY CUSTOMER FOR CONTROL UNIT AND DUST CLEARING CONNECTION BY CUSTOMER FOR KJELLBERG HIFOCUS 280I NEO	6 - 8 BAR 10 - 12 BAR
AIR CONSUMPTION	AT STANDARD STATE ACCORDING TO DIN 1343 CONTROL UNIT PLASMA HIFOCUS 280I NEO DUST CLEARING SYSTEM	134 NL/MIN 148 NL/MIN 45 NL/MIN



TECHNICAL SPECIFICATIONS

HYDRAULIC POWER PACK	VOLUME POWER PRESSURE	20 L/MIN 5.5 KW 15 MPA
WORKING HEIGHT	ABOVE FLOOR	640 MM
PIT	DIMENSIONS OF PIT FOR KC	5970 X 5766 X 275 MM
WEIGHT	MACHINE CABIN INCLUDING ROBOT SHORT INFEED AND OUTFEED CONVEYOR (PER PIECE) DUST CLEARING SYSTEM (OPTIONAL)	6200 KG 1020 KG 600 KG
MACHINE DIMENSIONS	LENGTH X WIDTH X HEIGHT (IN PIT)	3900 X 5140 X 4900 MM



TECHNICAL SPECIFICATIONS

ELECTRICAL EQUIPMENT	ACCORDING TO EN 60204-1 WITH FREESTANDING CONTROL CABINET AND OPERATING PANEL. ELECTRIC CONNECTION (TN-NETWORK) - 3 PHASES, EARTH		400/50 V/Hz
	SUPERIOR KC 1221	POWER CONSUMPTION	17 kVA
		FUSE OF MAINS LEAD	35 A
	KJELLBERG HIFOCUS 280I NEO	POWER CONSUMPTION	67 kVA
		FUSE OF MAINS LEAD	100 A



TECHNICAL SPECIFICATIONS

ELECTRICAL EQUIPMENT

KJELLBERG HIFOCUS 440I NEO

POWER CONSUMPTION

127 kVA

FUSE OF MAINS LEAD

200 A

**AMBIENT
TEMPERATURE**

**TEMPERATURE
DEVIATING TEMPERATURES ON REQUEST**

5-40°C



TECHNICAL SPECIFICATIONS

STANDARD EQUIPMENT

- **Robust Machine gantry** of reinforced box construction supporting an industrial robot.
- **6-axis Stäubli robot arm** with advanced motion control of the robotic arm plus two additional mechanical axis (transversal and vertical). The robot operates in a 600mm area between infeed and outfeed roller conveyor. The roller feed system is an additional axis of the robot cell (9th axis - no CNC axis).
- **All axes powered by brushless AC servomotors** with very long maintenance rates.
- **The torch head includes a torch bracket and anti-collision sensor**, which stops all movements in case of collisions without damaging the torch.



6-axis Stäubli Robot Arm



Collision Sensor



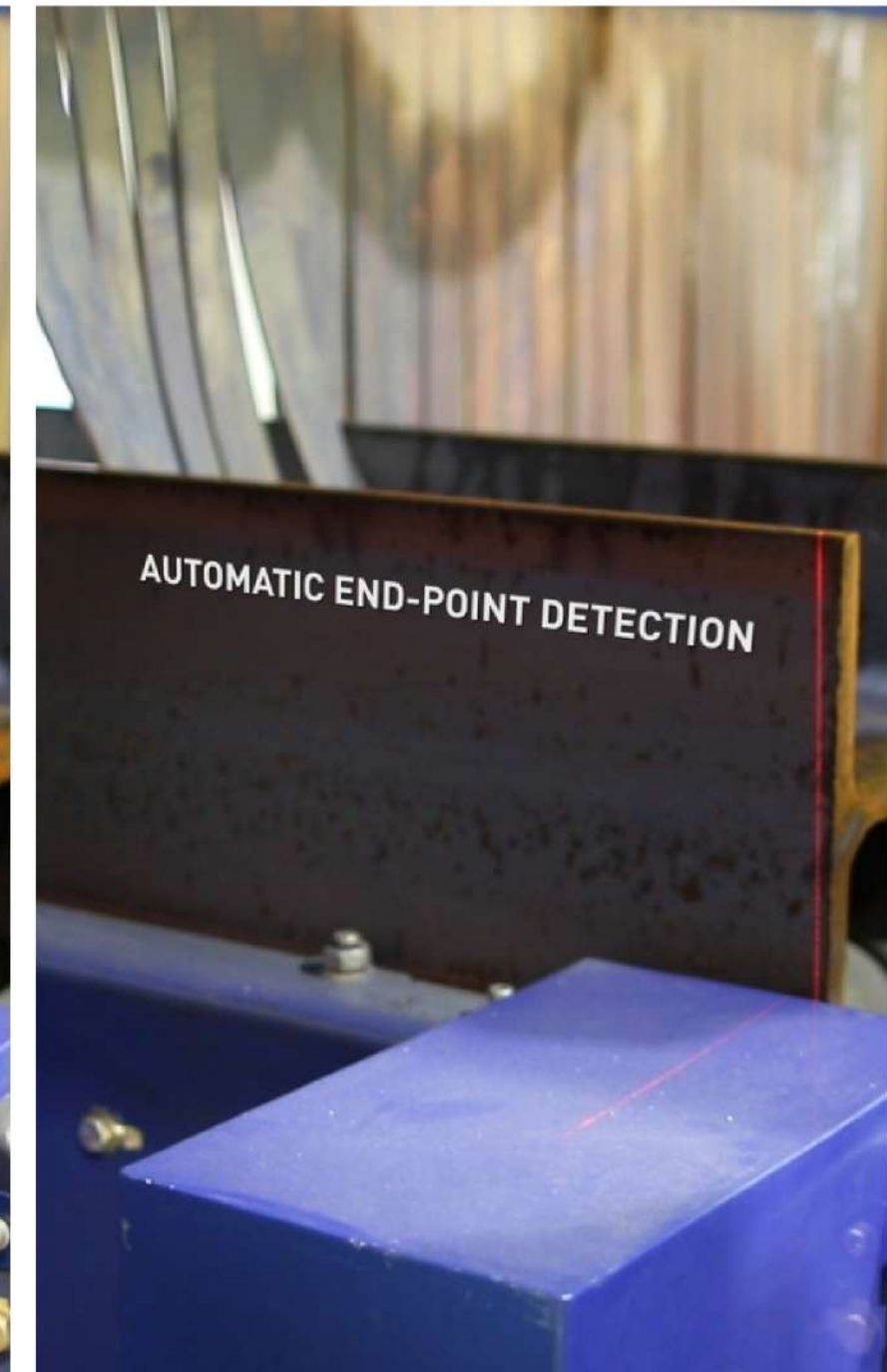
TECHNICAL SPECIFICATIONS

STANDARD EQUIPMENT

- **Material clamping** ensures that material is on the datum line and is activated once the material is inside the cutting cell and when the initialisation point is detected.
- **Initialisation point detection** is done by a laser measurement system in the cutting cell. Once the material is on the roller conveyor and on the datum line, the material will be moved into the cutting cell and the initialisation point is determined.
- **Length and position measuring system** is done by laser measurement system, which is placed at the end of the infeed roller conveyor. Once the initialisation point is detected the length of the beam can be measured with this sensor. Even during transport and processing, this sensor can always measure the actual position of the raw beam and cutting paths can be adjusted accordingly.



Material Clamping



Initialisation Point Detection



TECHNICAL SPECIFICATIONS

STANDARD EQUIPMENT

Plasma Unit Kjellberg HiFocus 280i neo with 280A. High definition plasma system with manual multi-gas console to cut mild steel. This unit is suitable for 4-sided plasma cutting and marking. Due to the PerfectHole technology of Kjellberg even holes with a small diameter have a very good cutting quality. Maximum material thickness on mild steel is 70mm. A starter kit is included.

Kjellberg HiFocus 280i plasma-cutting system with HiFocus technology for high cutting speeds with optimum cutting quality. Suitable for cutting carbide steel, stainless steel and aluminium.

Included is an operational plasma cutting unit with manual gas bracket and complete installation within the line, including a 3-phase filter pressure controller, which treats the secondary gas (air) to the required quality and correct pressure. Torch equipped with a quick coupling for easy exchange of wear parts. Unit is operating with an automatic torch height control.

Cutting thickness	unalloyed steel max.	70 mm
	economical up to approx.	50 mm
Output current, infinitely variable		10 – 280A
Gas supply		
Plasma gas	O2, air, N2, argon/hydrogen	
Secondary gas	air, N2, O2	
Quality of gas	cleanliness	99.995 %
	dry, oil free and clean, that means filtering up to 99.99 % of all particles of 0.025 micron	
Air quality		



TECHNICAL SPECIFICATIONS

STANDARD EQUIPMENT

- **Material displacement and distortion compensation** is done by two triangulation scanners from the top of the cutting cell. This is sufficient for most cutting applications. In this way, positional displacement, torsion and section distortion of raw material can be compensated by automated cutting path correction. For very high precision, an additional precision scanner is installed on the torch for 360-degree scanning requirements. The precision scanner can be activated by the operator if needed.
- **Cutting compensation and process imperfections** considers the cutting direction and compensates kerf, arc shape, melting effects and optimal plasma side utility. Therefore, the cutting quality is very accurate. Moreover, it's possible to achieve a minimum usage of consumables and high cutting speeds without compromising on quality. In this way, efforts for following processes like grinding and welding are minimized in terms of costs and time.
- **Fume extraction** is realised through two extraction points at the top of the cutting cell that create an upward airflow. Tunnels on the infeed and outfeed of the cutting cell generate a barrier for fumes to escape. In this way, the working environment is clean and temperatures in the cutting cell stay low for extended lifetime of all components.
- **Profile shapes:** The following profile shapes can be processed: H-profiles, U-profiles, equal and unequal angles and optionally flat material, square and rectangular tube and bulb profiles.
- **Description of production process:**
 - Material can be put on the cross transport field (if present) and can be transported onto the roller conveyor.
 - Material is placed against the datum line on the infeed roller conveyor.
 - Material is moved into cutting cell and initial point of material is detected.
 - Length of raw material on the roller conveyor is detected by laser measurement system at the end of the roller infeed conveyor.
 - Material is placed at the right cutting position (position is controlled by length laser measuring system).
 - Material deviation is scanned by triangulating lasers to detect displacement and/or distortion.
 - Cutting robot instantly starts the cutting process (if no 360° scan is needed).
 - Depending on the cut contour, waste or short parts have to be removed manually.
 - Longer parts (1700mm minimum) can be transported with the roller conveyor to the outfeed side.
 - Outfeed cross transport (if present) can transport and buffer material on the cross transport field.



TECHNICAL SPECIFICATIONS

MACHINE CONTROL

- **ProCAM** is the software suite for the coping robot and provides the following components:
 - ProGRAM for manual part programming and nesting function including stock management.
 - ProCAD/CAM-Interface for direct data transfer from CAD system via DSTV or optional STEP import.
 - Optimised 3D nesting algorithm that can use stock material.
 - 3D viewer of parts and nestings.
- **ProGRAM**
 - **Manual Data Input.** ProGRAM is the software tool for programming parts and cuts manually based on a material and profile shapes library. By defining different parameters of each profile shape, cutting paths can be generated and optimized fast and easily. All parts can be viewed and verified in 3D from different perspectives.
 - **Nesting.** ProGRAM also performs the nesting to match the parts, which should be produced with the current material in stock in an optimal way in terms of material utilisation.
- **Nesting (continued).** With intelligent algorithms, parts will be arranged in the best way to reduce waste and production time and to extend consumable lifetime.
- **Stock Manager.** The stock manager contains new raw material and rest material. Operators can assign nestings to material in stock for an efficient work preparation. Moreover, different reports can be generated (like reports about nestings, batches, rest lengths, cutting list, etc.).
- **ProCAD/CAM Interface:** Kaltenbach provides interfaces for many CAD systems (like Tekla) to enable an easy and fast import of complete structures into ProCAM. DSTV is the common import file format. There are also options to import STEP (see options). The software recognises all cutting shapes automatically and is not limited to any macros. After the import, parts can still be changed.
- **Antivirus Protection.** A licensed virus scanner is installed in the machine PC.
- **Third-party Software.** The machine PC is a control unit for the operation of the machine. PC hardware and software are synchronised in an optimal way. Changes at the system may have a negative effect on the functionality of the machine. For this reason, each change at the system during the warranty period, especially the installation of third-party software, has to be agreed with Kaltenbach.



TECHNICAL SPECIFICATIONS

OPTIONAL EQUIPMENT: COPING ROBOT

KC1221-1 Scrap trolley is below the cutting area and collects scrap and slag from the cutting process.

KC 1221-2 Dust clearing system for plasma-flame cutting unit Dust clearing system with lateral attached preliminary filter and dust collection bag (100 l). Filter unit with 6 flame-resistant cartridges as well as automatic filtration system. The customer has to provide the suction tubes from the suction position at the machine to the dust clearing system.

Max. distance between position of the dust clearing system and the machine is 15 m. The customer places and fixes these tubes according to his local conditions. For processing of stainless steel, the filtered air has to be guided into the open air. This dust clearing system is not suitable for processing of aluminium.

TECHNICAL DATA (KC 1221-2)

Filter area

121,8 m²

Air intake volume

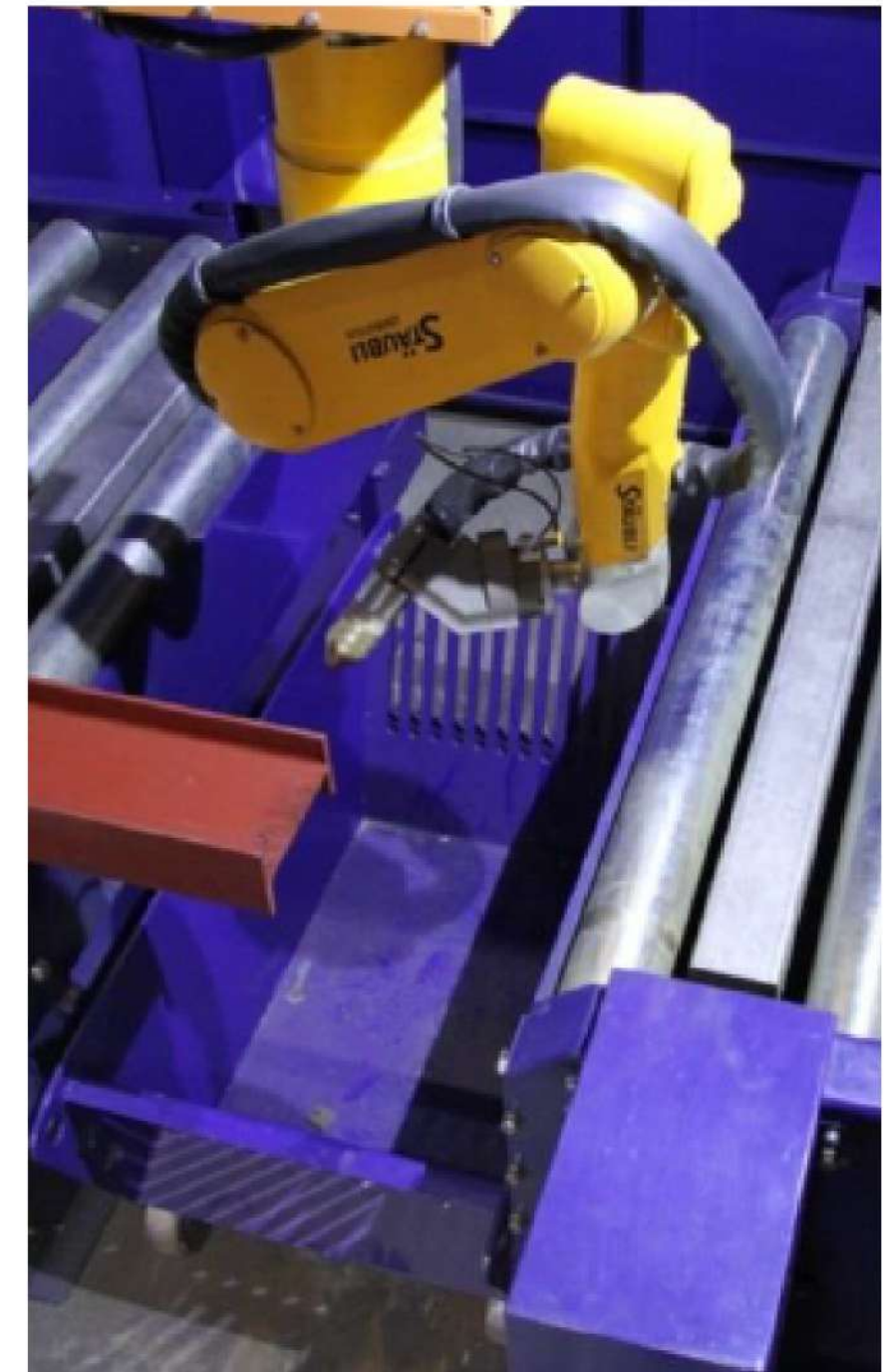
approx. 4.700
m³/h

Drive motor

7.5 kW

**Compressed air
connection**

6 bar



Scrap Trolley



TECHNICAL SPECIFICATIONS

KC 1221-3 HiFocus 440i neo with 440A for higher cutting performance for material up to 80mm.

KC 1221-4 Plasma flame-cutting unit Hypertherm XPR 300 with max. 300A High definition plasma system with automatic as console to cut mild steel. This unit is suitable for 4-sided plasma cutting and marking. Due to the True Hole technology, even holes with a very small diameter have a very good cutting quality. Maximum material thickness on unalloyed steel is 80mm. A starter kit is included.

Hypertherm model XPR 300 plasma-cutting system with patented X-definition™ and long-life technology for high cutting speeds with optimum cutting quality. Suitable for cutting unalloyed steel, alloyed steel and aluminium. Nozzles and wear parts for unalloyed steel 300 ampere are included in the scope of supply.

Included is an operational plasma cutting unit with automatic gas connection console type Core and complete installation within the line, including a 3-phase filter pressure controller, which treats the secondary gas (air) to the required quality and correct pressure.

Cutting thickness	unalloyed steel max.	80 mm
	unalloyed steel, economical up to approx.	45 mm
Output current, preselectable		30 - 300 A
Gas connection console	Type Core	
Plasma gas	O2 (oxygen), air, N2 (nitrogen) - N2 is only for a short period added to the oxygen during ignition or switch-off of the electric arc (long-life technology).	
Secondary gas	air, N2, O2	
Quality of gas	clean (liquid gas is recommended)	99.995 %
Air quality	dry, oil free and clean, that means filtering up to 99.99 % of all particles of 0.025 micron	



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TECHNICAL SPECIFICATIONS

Torch equipped with a quick coupling for easy exchange of wear parts. The XPR-interface provides extensive data on gas pressures, preventive maintenance and error messages (WLAN-capable terminal is not included in the scope of supply).

Unit is operating with an automatic torch height control. Furthermore, Hypertherm requires that the gas regulators for O₂ and N₂ (to be provided by customer) have to be placed within 3m from the gas connection console. For processing of stainless steel or aluminium, additional measures for exhaustion and filtering are required.

KC 1221-5 Further transport table for plates.



Hypertherm XPR 300



TECHNICAL SPECIFICATIONS

OPTIONAL EQUIPMENT: SOFTWARE

KC 1221-6 CAD-Interface Inventor enables fast and easy import of STEP files by Inventor. All material types are supported.

KC 1221-7 CAD-Interface SolidWorks enables fast and easy import of STEP files by SolidWorks. All material types are supported.

KC 1221-8 Cutting Intelligence for bulb profiles enables cutting path generation and nestings.

KC 1221-9 Cutting Intelligence for flat profiles enables cutting path generation and nestings.

KC 1221-10 Cutting Intelligence for square tubes enables cutting path generation and nestings.

KC 1221-11 Cutting Intelligence for plates enables programming, nesting and processing by means of vertical cuts of sheet metal parts.

KC 1221-11 (CONTINUED) In addition to the software, a transport table equipped with slats is also supplied. This means that sheets can be conveyed easily on the roller conveyor and also cross transports. The sheet thickness must be at least 8mm; the maximum thickness depends on the plasma source used. The maximum sheet width is 1200 and the maximum sheet length is 3070 mm.

OPTIONAL TRAINING SESSIONS

KC 1221-12 Additional 3-day training on customer site one month after production start familiarises the operator more with the machine capabilities in terms of hard- and software.

KC 1221-13 Pre-Operator Training

KC 1221-14 Pre-Work-Preparation Training

All "PRE" training session are for 2 days and for 2 persons at the Kaltenbach Experience Center before commission of the machine. This session ensures a quick and efficient production ramp-up and a fast return on investment. These training courses include costs for boarding, lodging and local transport, but airplane tickets are excluded.



LENGTH MEASURING SYSTEM

TECHNICAL DATA

- Measuring range up to max. 18,0 m

STANDARD EQUIPMENT

- Sensor light barrier at the end of the infeed roller conveyor detects the position of the beam on the roller conveyor and is used to detect the raw material length.
- The measurement takes place at the stop edge on the flange of the material at a height of approx. 40mm above the roller conveyor level – lower materials must be manually equipped with a magnetic sheet at the end in order to be measures reliably.
- The measurement result depends on the flange thickness and the distance between the end of the material and the sensor as well as the nature of the reflective surface (please refer to the table).

Flange thickness	Profile length 12-14m			Profile length 14-16m			Profile length 16-18m		
	1	2	3	1	2	3	1	2	3
5mm	ok	-	-	ok	-	-	ok	-	-
8mm	ok	ok	ok	ok	-	-	ok	-	-
>8mm	ok	ok	ok	ok	ok	ok	ok	ok	-

1 = Magnetic shield

2 = Straight surface (with or without paint) – e.g. after straight saw cut

3 = Straight, but rusty surface

OPTIONAL EQUIPMENT: LENGTH MEASURING SYSTEM

KC 1221-15 Extension of the measuring length by further 18 m with a **pop-up laser**. Additional sensor for material length measurement and position detection in the infeed roller conveyor for raw material lengths over 18 m. Sensor is built into the infeed roller conveyor and can lower and raise to allow both short and long beams to be fully processed. The measuring length and position are automatically transferred between the sensor systems in the roller conveyor.



T14 TRANSPORT SYSTEM

TECHNICAL DATA

ROLLER CONVEYORS

- Working height **640 mm**
- Roller diameter **77,4 mm**
- Roller width **1430 mm**
- Effective roller width **1300 mm**
- Transport speed max., infinitely **0 - 30 m/min**
- Material weight **20 - 1000 kg/m**
- Infeed roller conveyor, for material lengths from - to **2.2 - 12 m**
- Outfeed roller conveyor, for material lengths from - to **2.2 - 12 m**

OPTION: CROSS TRANSPORTS VIA DRAG CHAINS

- Transport speed forward min. - max. **0 - 10 m/min**
- Reverse speed min. - max. **0 - 30 m/min**
- Total depth incl. roller conveyor width **3 m**
- Drag weight per cross transport motor **4.5 t**

OPTION: CROSS TRANSPORT VIA LIFT AND CARRY SYSTEM (ALTERNATIVE TO THE DRAG CHAIN SYSTEM)

- Transport speed **0 - 10 m/min**
- Reverse speed **0 - 30 m/min**
- Total depth incl. roller conveyor width **3 m**
- Lifting capacity of each transport beam **2 t**
- Lifting height of transport beam above roller level **65 mm**

OPTION: CROSS TRANSPORT VIA TRAILING HOOKS (ALTERNATIVE TO THE DRAG CHAIN SYSTEM)

- Transport speed, forward min. - max. **0 - 10 m/min**
- Reverse speed, min. - max. **0 - 30 m/min**
- Total depth incl. roller conveyor width **3 m**
- Drag weight per cross transport motor **4.5 t**



T14 TRANSPORT SYSTEM

DESCRIPTION

ROLLER CONVEYORS

- Operation at the freestanding operating cabinet
- Roller conveyor sections in modular system, executed in solid welded construction with solid transport rollers with ball bearings.
- Roller conveyor drive of the infeed and outfeed side with frequency controlled gear motor. Forward and reverse speed infinitely variable.
- Vertical alignment rollers arranged on the datum line.
- Buffer, hinged, placed at the end of outfeed roller conveyor
- Sensor as roller conveyor limit switch in outfeed roller conveyor

OPTION: CROSS TRANSPORT VIA DRAG CHAINS

- Operation at the freestanding operating cabinet
- Material stillages in heavy steel construction
- Polyamide wearing strips for noiseless material cross transport
- Drag chain with spring loaded transport claws, working in one direction.

OPTION: CROSS TRANSPORT VIA DRAG CHAINS (CONTINUED)

- Drive system with frequency controlled gear motor, infinitely variable.
- Sensor on the infeed material datum line for creep speed approach towards the alignment rollers and final limit switch for cross transport movement.
- Rotary encoder for measuring the position of the transport claws to avoid collision with material or measuring carriage in the range of the roller conveyors.

OPTION: CROSS TRANSPORT VIA LIFT AND CARRY SYSTEM (ALTERNATIVE TO THE DRAG CHAIN SYSTEM)

- Operation at the freestanding operating cabinet.
- Hydraulic liftable and lowerable transport beams, two-way movement over entire cross transport depth.
- Drive system with frequency controlled gear motor, infinitely variable.
- Each transport beam has its own hydraulic power pack.

OPTION: CROSS TRANSPORT VIA TRAILING HOOKS (ALTERNATIVE TO THE DRAG CHAIN SYSTEM)

- Operation at the freestanding operating cabinet
- Material stillages in heavy steel construction
- Polyamide wearing strips for noiseless material cross transport
- Hydraulically lift- and lowerable trailing hooks, working in both directions.
- Hydraulic power packs for each cross transport
- Drive system with frequency controlled gear motor, infinitely variable.
- Sensor on the infeed material datum line for creep speed approach towards the alignment rollers and final limit switch for cross transport movement.
- Rotary encoder for measuring the position of the trailing hooks to avoid collision with material or measuring carriage in the range of the roller conveyors.



T14 TRANSPORT SYSTEM

OPTIONAL EQUIPMENT: T14 TRANSPORT SYSTEM, INCLUDED IN THE QUOTE PRICE

SAFETY BARRIER. This safety device is necessary for the operation of the machine/line in EU countries in accordance with the current EU machine regulation. The safety barrier shall protect persons from moving material or moving parts of the transport and measuring unit in the range of the material infeed or outfeed side. The protection is performed by safety fences and light-grill barriers.

T14-1/3 Safety light-grill barrier, 3 pieces, comprising a 3-beam transmitter and receiver as well as an evaluation unit. Max. tracing range 20 m

FURTHER OPTIONAL EQUIPMENT: T14 TRANSPORT SYSTEM ON REQUEST

T14-SK-K1 Infeed cross transport via drag chains

T14-HW-K1 Infeed cross transport via lift-and-carry system (instead of drag chains)

T14-QTP-K1 Infeed cross transport via Trailing Hooks (instead of drag chains)

T14-SK-L2 Outfeed cross transport via drag chains

FURTHER OPTIONAL EQUIPMENT: T14 TRANSPORT SYSTEM ON REQUEST (CONTINUED)

T14-HW-L2 Outfeed cross transport via lift-and-carry system (instead of drag chains)

T14-QTP-L2 Outfeed cross transport via Trailing Hooks (instead of drag chains)

Extension of the infeed/outfeed cross transport depth by each 1 m, per drag chain/lift-and-carry stillage

T14-5 Silencer System for low-noise material cross transport in the area of the roller conveyors by additional, pneumatically lift- and lowerable rollers with automatic control. The minimum number of silencer is equivalent to the number of cross transports plus one more for each cross transport field. (Not suitable for lift-and-carry-system)

Additional safety light-grill barrier, comprising a 3-beam transmitter and receiver as well as an evaluation unit. Max. tracing range 20 m

T14-2 Safety fence for roller conveyor / measuring system and cross transport, per running meter.

T14-3 Cooling device for the switchboard cabinet (required if ambient temperature exceeds + 35°C)

T14-4 Heating device for the switchboard cabinet (required if ambient temperature is less than + 5°C).

OTHER - T14 transport system for different material lengths on request



THE PRODUCTION PROCESS

Our primary focus is the supply of production automation for the heavy steel industry. Thermal cutting machinery provides beams with highly accurate 3D weld preparations for significant savings on fitting and welding time and costs.

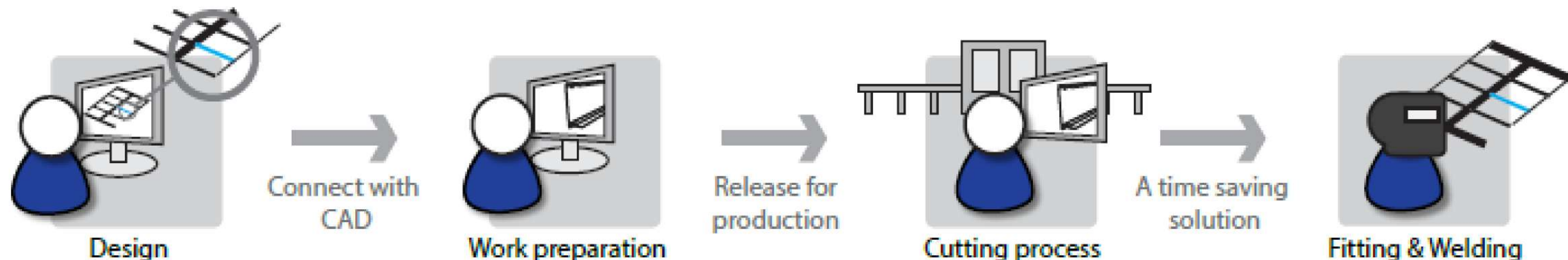
We are fully aware that the cutting machine forms only a small part of an entire manufacturing process so it is essential that the machine fits perfectly within the entire production process, from design and work preparation upstream, to the cutting, fitting and welding of parts downstream.

INTEGRATION INTO THE PROCESS

Although it is the actual cutting that is carried out by the machines, the smooth integration of the machine into the production system is achieved by an advanced software framework called ProCAM.

By connecting with an extensive range of CAD/CAM applications, features for design check, perfect integration with the machine, managing your stock or automatic nesting, ProCAM saves time and money in the complete process.

The continuous development of special cutting routines, outfitting functionality and weld volume calculations optimises the subsequent 'fitting and welding' stages of production, increases productivity and saves time and materials.





THE PRODUCTION PROCESS

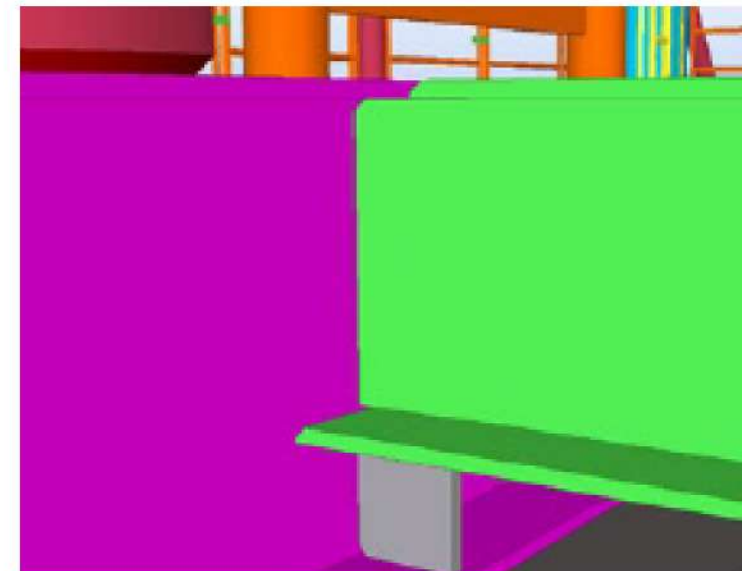
DESIGN

Kaltenbach developed CAD/CAM connections for several CAD applications. Reprogramming of complex designs is no longer necessary due to imports of various file formats that save time and greatly reduce error sensitivity. In case there is no CAD package available, Kaltenbach's ProGRAM offers complete parametric part design and macro application to all compatible profiles.

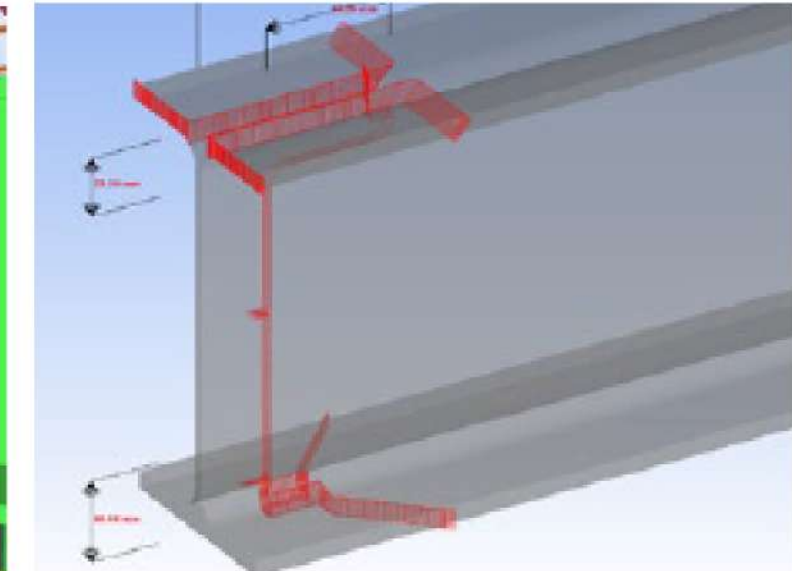
WORK PREPARATION

Kaltenbach's ProGRAM module, part of the ProCAM suite, can be installed on an independent office workstation and connected to the database providing a direct link to the cutting machine (in the absence of a database, cutting files can be copied to a USB stick which can then be read by the cutting machine).

If there is no input from CAD, individual parts can be programmed using the manual programming tool. One of the unique features of the module is the 3D Viewer allowing validation and review of all programmed parts. The Optimised Nesting tool distributes the programmed parts in the available raw materials in the most efficient way. This reduces waste and handling time and greatly improves planning efficiency.



Tekla Structures CAD model



Kaltenbach's part design module



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THE PRODUCTION PROCESS

CUTTING PROCESS

In this part of the process all Kaltenbach's software intelligence congregates and results in a perfectly cut shape including weld preparation. These high quality cuts are the result of smart machine design and the advanced motion control of the robotic arm. To achieve the most accurate cuts Kaltenbach's cutting machines have software based cutting compensations for the cutting process like kerf width and the teardrop shape of the plasma beam.

Due to this machine intelligence, it's possible to achieve a minimum usage of consumables and high cutting speeds without compromising on quality.

FITTING, BOLTING OR WELDING

When cutting manually or with a less accurate machine, grinding is a costly, time-consuming and labour-intensive job. The excellent quality and accuracy of Kaltenbach profiling machines reduce grinding to a minimum resulting in shorter fitting time of bolted connections.

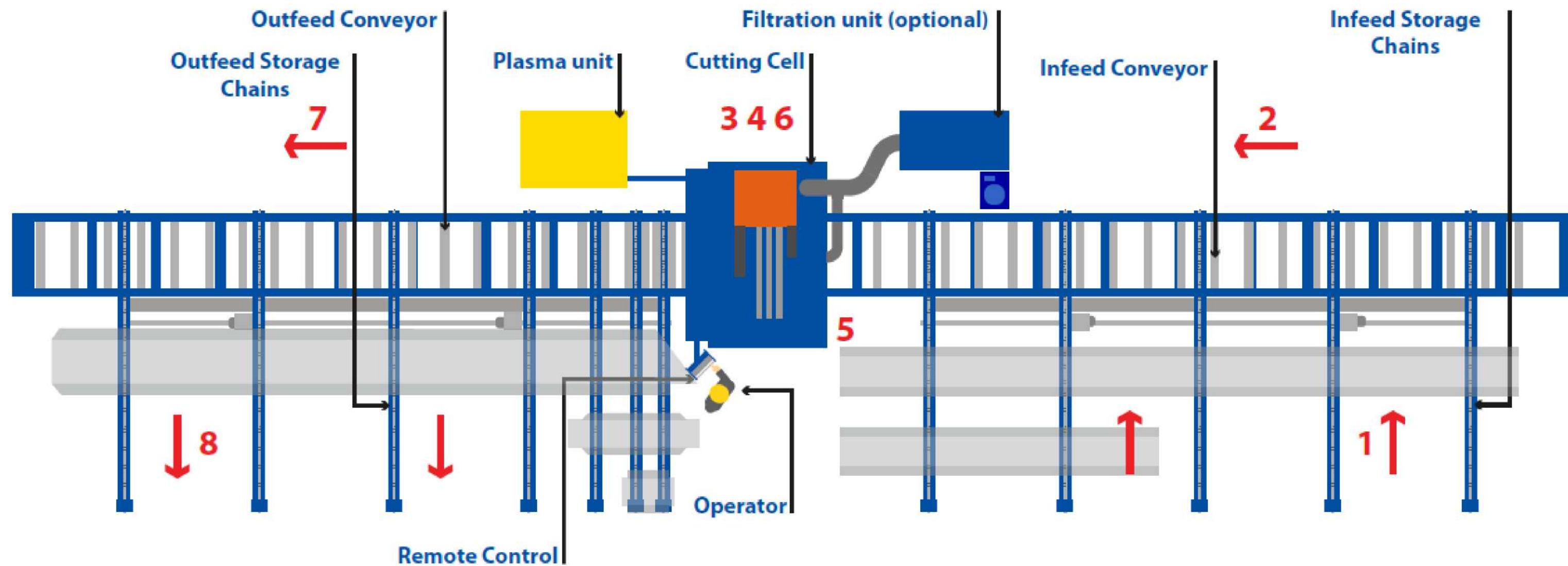


These factors apply similarly to welded connections. A larger weld volume increases the welding time and costs. Consistent, accurate bevels reduce welding time, keeps consumables running longer and have the additional benefit of increasing the quality and strength of a structure.

Kaltenbach is constantly developing and supplying new cutting and marking routines to further eliminate the need for grinding and reduce welding times and volumes even more.



PROCESS DESCRIPTION





PROCESS DESCRIPTION

The SUPERIOR KC 1221 can be configured to your needs and the materials that you want to cut. The logistics can be mirrored or extended in various ways. The process of the SUPERIOR KC 1221 is explained with the layout below as a reference.

1

INFEED STORAGE CHAINS

The infeed storage chains provide storage for multiple raw profiles by crane or forklift and transport profiles onto the infeed conveyor.

2

INFEED CONVEYOR

The infeed conveyor supports and transports raw profiles towards the cutting cell.

3

DEFINING LENGTH AND POSITION

The end of the profile is conveyed into the cutting cell. The longitudinal position is measured by rollers placed against the flanges and a laser measurement system.

4

MATERIAL MEASUREMENT

In the cutting cell, the raw profile is guided by rollers which measure distortion of the lower part of the profile. This measurement and a triangulation scan of the profile section enables the machine to define the actual positional displacement, torsion and section distortion of the raw material to compensate the theoretical cutting paths.

5

MARKING

Marking is performed as a separate action and can be integrated in the cutting process to decrease the material movement time.

6

CUTTING

Once the raw profile is in position, the industrial robot moves the plasma cutting torch to the starting position and instantly begins the cutting process. After a cut is made, the scrap piece will fall into the scrap trolley leaving only the cut part on the outfeed conveyor. Depending on material type and profiling shape the operator needs to remove cut out web and flanges between cuts.

7

OUTFEED CONVEYOR

The outfeed conveyor transports processed parts until detected by a sensor after which the roller conveyor stops automatically.

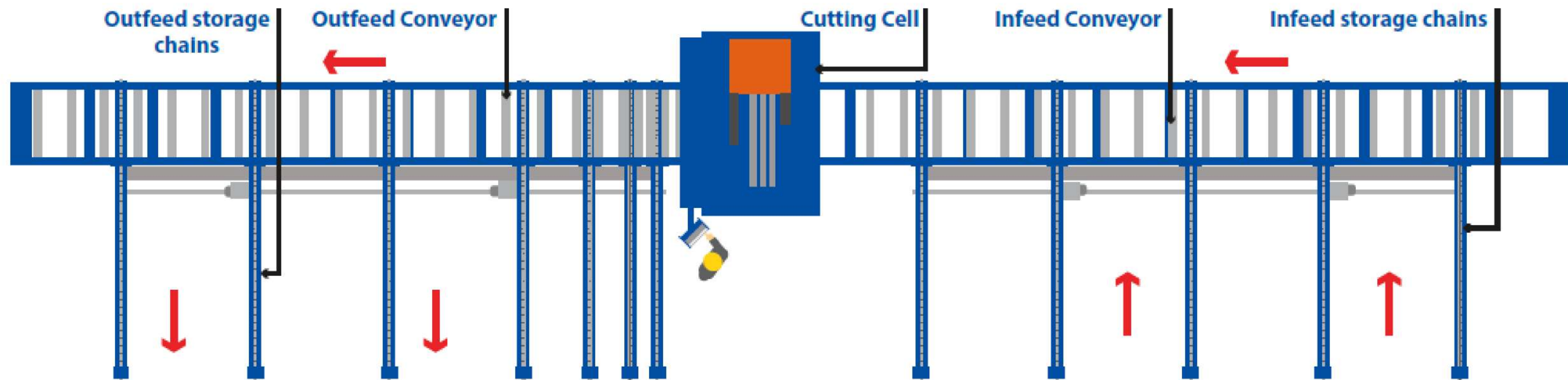
8

OUTFEED STORAGE CHAINS

The outfeed storage chains can store and buffer multiple profiles which can be transported to other logistic systems or unloaded by a crane or forklift. After receiving a signal that a processed part is in position to be unloaded, the hydraulic lifter underneath the storage chains lifts the part. The storage chains automatically space the parts at a set distance.



INFEEED AND OUTFEED



Logistics of a typical configuration



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INFEED AND OUTFEED

The infeed and outfeed conveyors for the cutting cell can be loaded directly by crane or by optional storage chains onto which material can be loaded and unloaded by a crane or forklift.

COMPONENTS

INFEED STORAGE CHAINS

The infeed storage chains load raw profiles in preparation for cutting. The profiles are transported on the chains towards the infeed conveyor. Sensors detect the material and the chains are raised lifting the material, and lowered again placing the material on the rollers of the infeed conveyor.

INFEED CONVEYOR

All cylindrical rollers are powered and transport profiles to and from the cutting cell. The infeed conveyor transports profiles until detected by a light sensor after which the infeed conveyor stops. The spacing of the rollers is optimised to cut both long and short parts (see technical data for sizes).



Outfeed conveyor



Infeed storage chains and infeed conveyor

OUTFEED CONVEYOR

Finished parts are transported from the cutting cell to the outfeed conveyor. Sensors on the conveyors detect the position and stop the parts.

OUTFEED STORAGE CHAINS

The outfeed storage chains can store and buffer multiple parts which can be transported to other logistic systems or unloaded by a crane or forklift.

After receiving a signal that a processed part is in position to be unloaded, the hydraulic lifter underneath the storage chains lifts the part. The storage chains automatically space parts at a set distance.



DEFINING LONGITUDINAL MATERIAL POSITION

To prevent length deviations of cut parts the SUPERIOR KC 1221 is equipped with an ingenious longitudinal laser measurement system. This laser system fits perfectly into the character of this machine, namely fast and accurate.

MATERIAL INITIALISATION POINT

The infeed conveyor will start conveying the profile into the cutting cell after it is loaded by the infeed storage chains. At this moment the machine doesn't know the length and longitudinal position of the profile. Once the profile enters the cutting cell the initialisation point can be defined on the profile end.

This is the reference point of all cutting paths calculated for this profile. If the first part cut from the profile is irregular, the initialisation point can be displaced easily. The initialisation point of the material is now defined, but the length and longitudinal position is still unknown.

MATERIAL END-POINT

The end-point of the material is measured by a laser measurement system that defines its longitudinal position. With the initialisation point as reference the exact length of the profile is calculated.

The infeed conveyor will transport the profile and its defined initialisation point into the cutting area of the cell. This area is within reach of the robotic arm. The positioning of the material is done by a motor in the rollers of the conveyor. Due to possible slip during transport, the actual longitudinal position is uncertain, but corrected by measuring the end-point again after all transport actions are performed.

ACCURATE TORCH APPROACH

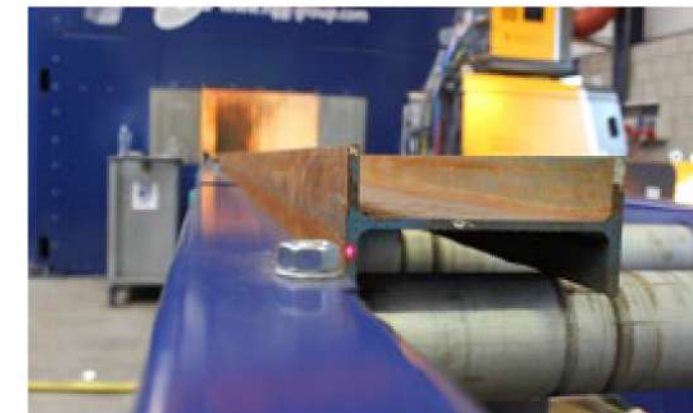
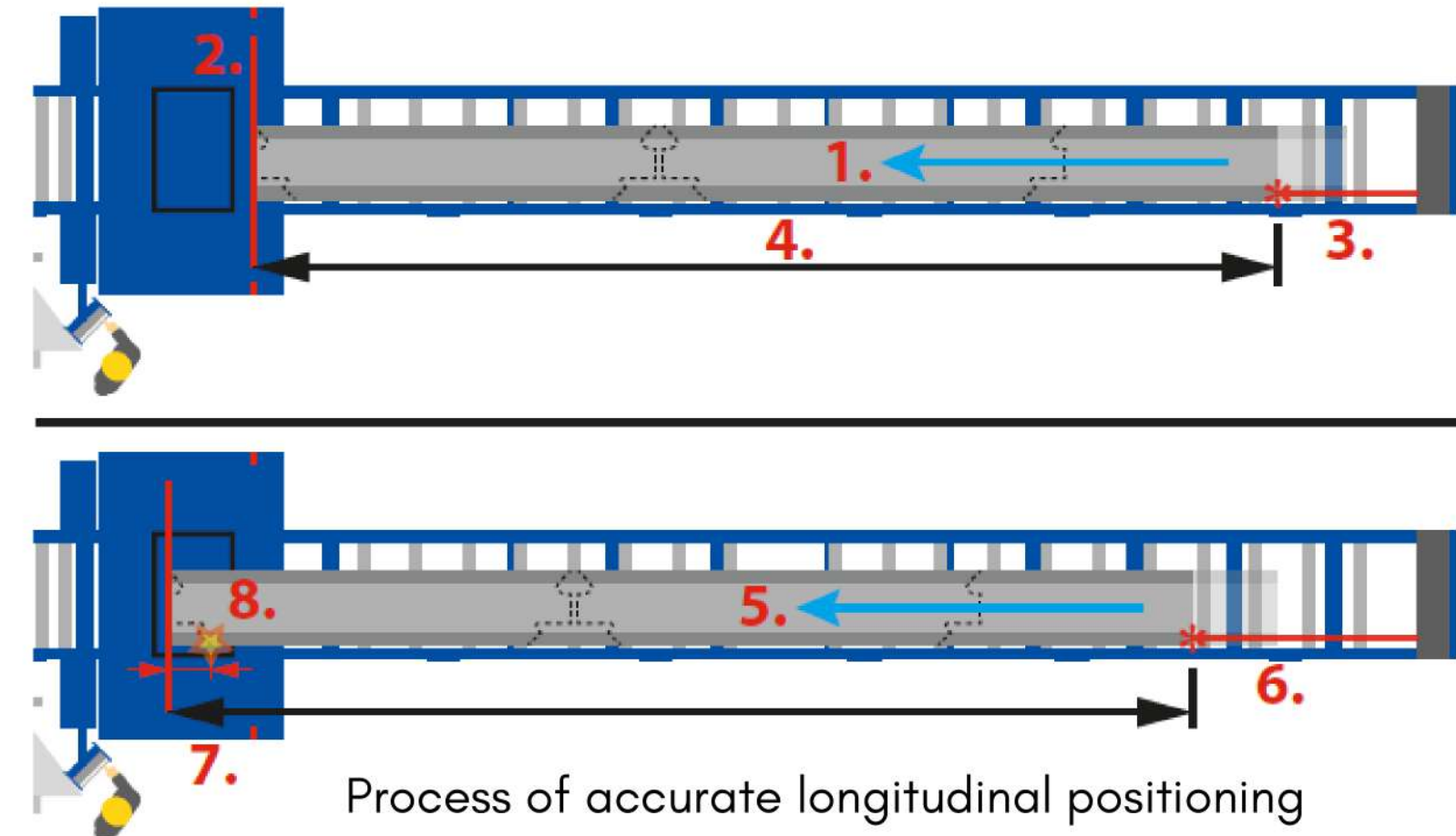
The actual initialisation point of the cutting path is known to the machine and the robotic arm moves to this point in a split second.

EASE OF USE

Due to optical measurement, calibration is not necessary. There is no risk of losing the calibration and without moving parts, the measurement system is less error and maintenance sensitive.

PROCESS OF ACCURATE LONGITUDINAL POSITIONING

1. Infeed material;
2. Defining initialisation point on material;
3. Defining material end-point with laser measurement system;
4. Calculation of all cutting paths in reference to the initialisation point;
5. Infeed of material to cutting area (actual position uncertain because of slip during conveyor transport);
6. Defining actual longitudinal material end-point position after conveyor transport;
7. Calculation of actual longitudinal position of cutting path start-point referred to the material initialisation point;
8. Approach of the robotic arm and torch to the actual cutting path start-point.



Length measurement laser on profile



Length measurement system position



CUTTING CELL

The multifunctional cutting cell is the heart of robotic profiling machine. The industrial Stäubli robotic arm manipulates the cutting torch to cut profiles. The laser scanners in the cell provide accurate measurements that are absolutely crucial for positioning of the cutting torch and provide high quality and precise cuts. Additionally, the cutting cell incorporates a fume extraction system.

THE BASE FOR ACCURACY

Rapid robot movements and accurate positioning needs a rigid base to prevent vibrations and deviations. The cutting cell is engineered to last and enables accurate cutting.

RAPID AND ACCURATE MATERIAL MEASUREMENT

To measure and compensate the distortions and deviations of profiles, the SUPERIOR KC 1221 is equipped with multiple measurement positions. The scanner scans material before cutting after which one or multiple cutting routines can be performed. The scans can be reviewed, giving the operator a reference of what has actually been measured. The alignment of the material is verified to see if the profile is off-center in the cutting cell (this usually means the profile is bow shaped, bent or twisted).



The robot hanging inside the cutting cell





CUTTING CELL

FREEDOM OF ROBOT MOVEMENT

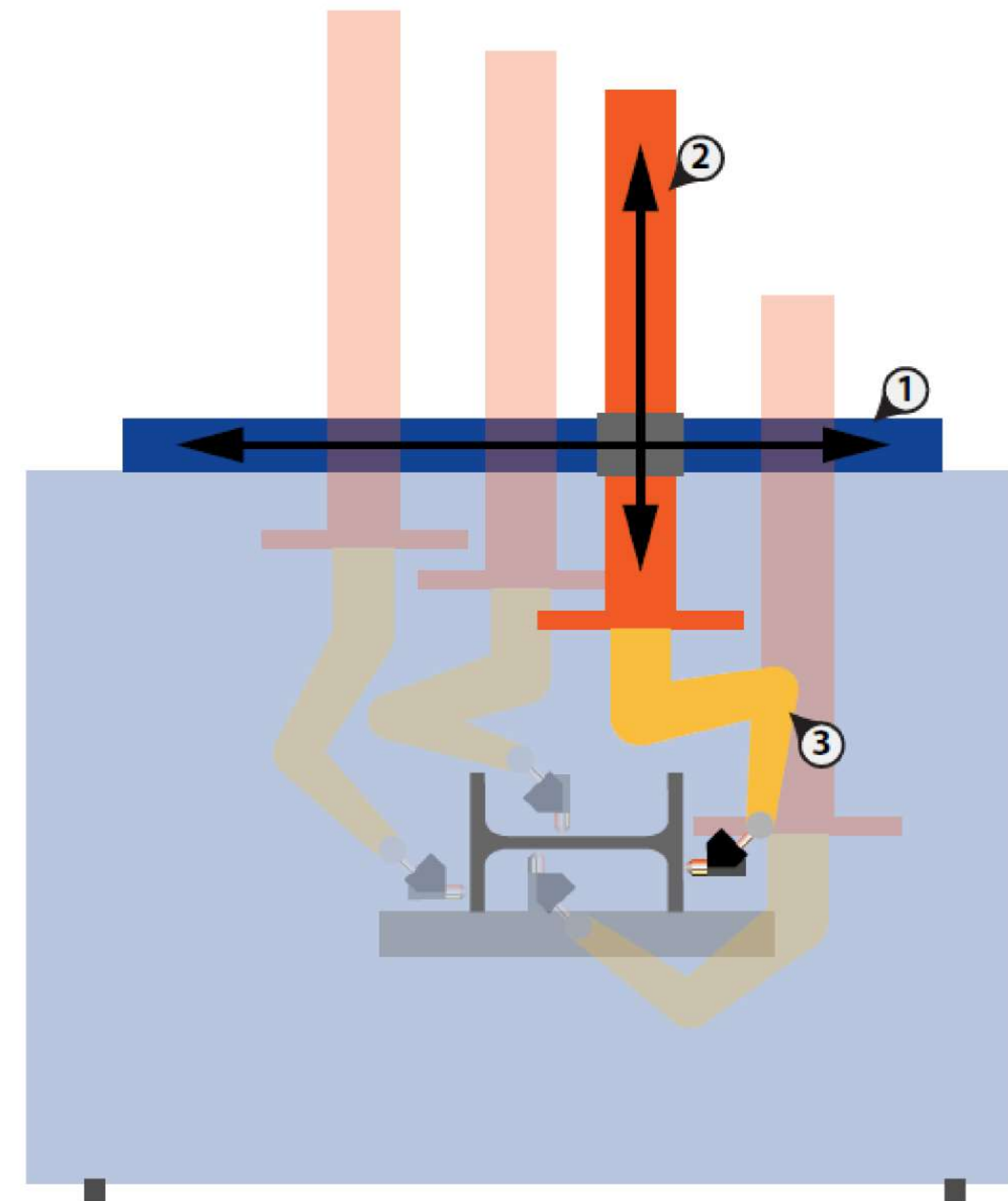
A transversal axis and a height axis are responsible for the gross industrial robot positioning needed for cutting an marking 360 degrees around the material.

The industrial robot will perform the fine movements necessary for accurate torch positioning and bevelling. The combination of the gross robot positioning and the use of a short industrial robot arm for fine positioning results in accurate cuts and rapid torch positioning.

The diagram shows the side view of the cutting cell with the (1) transversal axis, (2) height axis and, (3) Stäubli robot with 6 axes.

INTUITIVE OPERATOR INTERFACE

Kaltenbach's software engineers developed a GUI inspired by the input of the SUPERIOR KC 1221 users all over the world. The result is an intuitive and easy to use interface which requires only a few days of operator training for full machine operation.





CUTTING CELL

EFFECTIVE FUME EXTRACTION

Plasma gasses are toxic by definition. Therefore it is very important to extract these gasses properly. By use of a fume extraction system, the operator maintains a clear view through the cutting cell window without smoke blocking his view.

NOISE REDUCTION

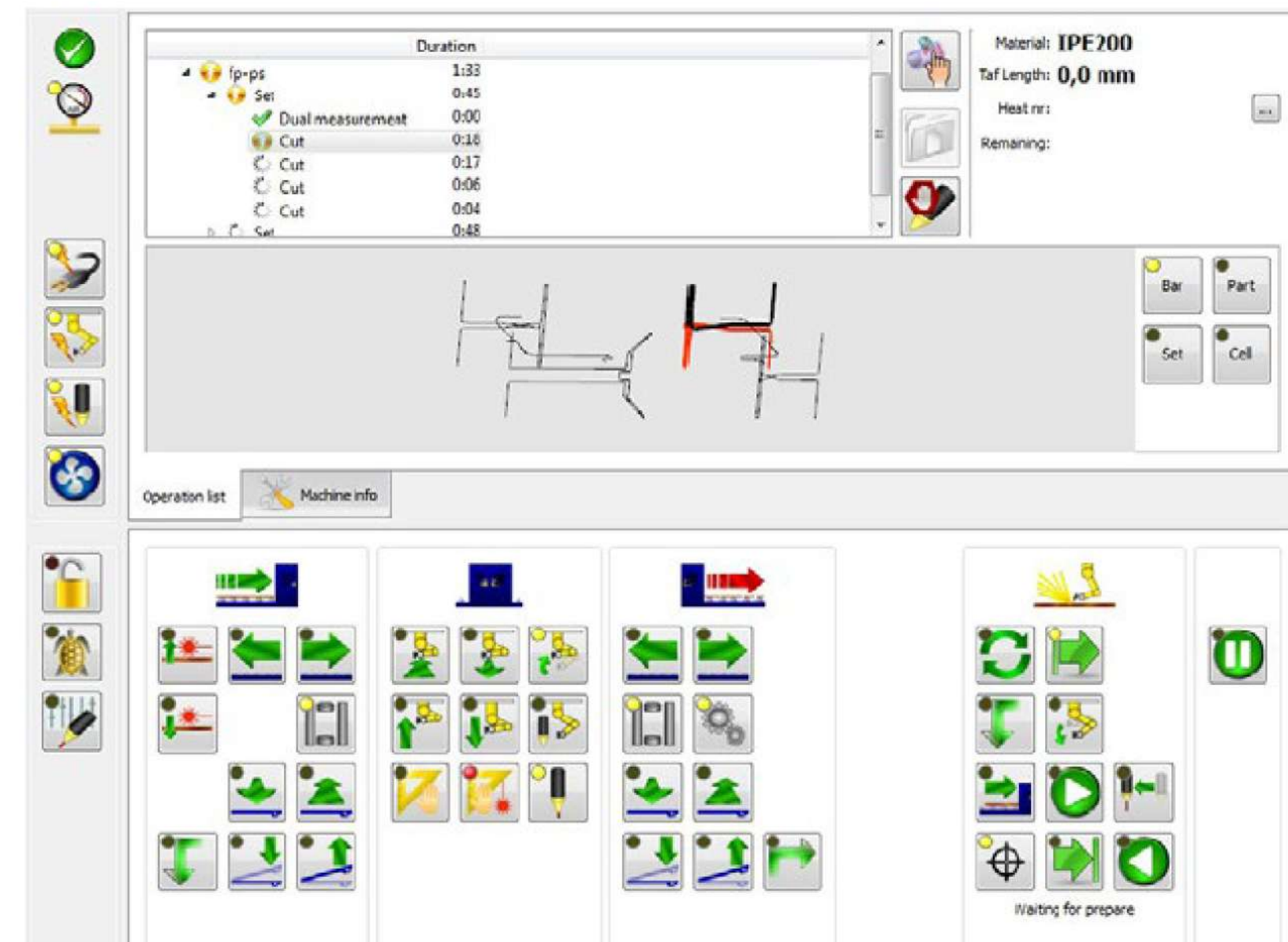
The double walls of the cutting cell create a barrier for the loud noises that plasma cutting can generate.



Operator using the GUI



The inside of the cutting cell



Operating GUI optimised for a touch screen. This screen is used during the cutting process.



INDUSTRIAL ROBOT

In regards to plasma cutting and robot compatibility, considerations must be made with high temperatures and particle emissions in mind. Kaltenbach has been using Stäubli robots with custom software for over a decade and these robots have proven their worth.

There is a wide range of different reasons as to why Kaltenbach chooses Stäubli robots when it comes to plasma cutting:

- Higher accuracy due to smaller arms;
- Rigid structure allows highly dynamic movement;
- Electronics are closed off from harmful plasma dust;
- Resistance to high temperatures due to fluid oil lubrication.

COMPONENTS

ROBOT ARM

The robot arm has six axes. The rigid structure used with metal castings results in good dynamic performance and stability. The enclosed structure can be used in a hostile environment with smoke and plasma dust. High accuracy is achieved by Stäubli's patented reduction gear system. This gear system gives the robot arm unrivalled precision, flexibility and speed along with reduced maintenance. Due to Kaltenbach's unique application of the robot, high positioning accuracy is achieved.

Whereas most machine fabricators quote the repeatability accuracy of their robot applications, the Kaltenbach system distinguishes itself by the rapid and accurate measurements to immediately correct the theoretical cutting path. This makes the machine up to one and a half times as productive without compromising on accuracy.

TORCH HOLDER

The torch bracket is milled out of a solid block of aluminium, enhancing the rigidity of the total assembly resulting in higher accuracy during cutting.

OPTICAL SCANNER

The torch holder has a built-in optical scanner to detect material distortions and deviations. The measurements are necessary to define the actual material position and shape and recalculate the theoretical cutting paths. To protect the optical scanner from plasma light and sparks, an automatic shutter is added that closes after scanning.



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INDUSTRIAL ROBOT

COMPONENTS

SHOCK SENSOR

The shock sensor is mounted between the robot arm and torch holder and is connected to a quick-release mechanism. In the unlikely event of an impact between torch and material, the torch is released, preventing damage to the robot arm. This is an additional safety feature, because the measurements of the material prevents collision of the torch.

ROBOT CALIBRATION

The operator can use a wizard in the machine software to calibrate the robot in the blink of an eye. The wizard moves the robot to a few positions and asks the operator to enter a few measured distances. The software compensates the robot positions if the measurements deviate. Robot calibration secures accurate cuts.



Industrial robot that is used in the SUPERIOR KC 1221

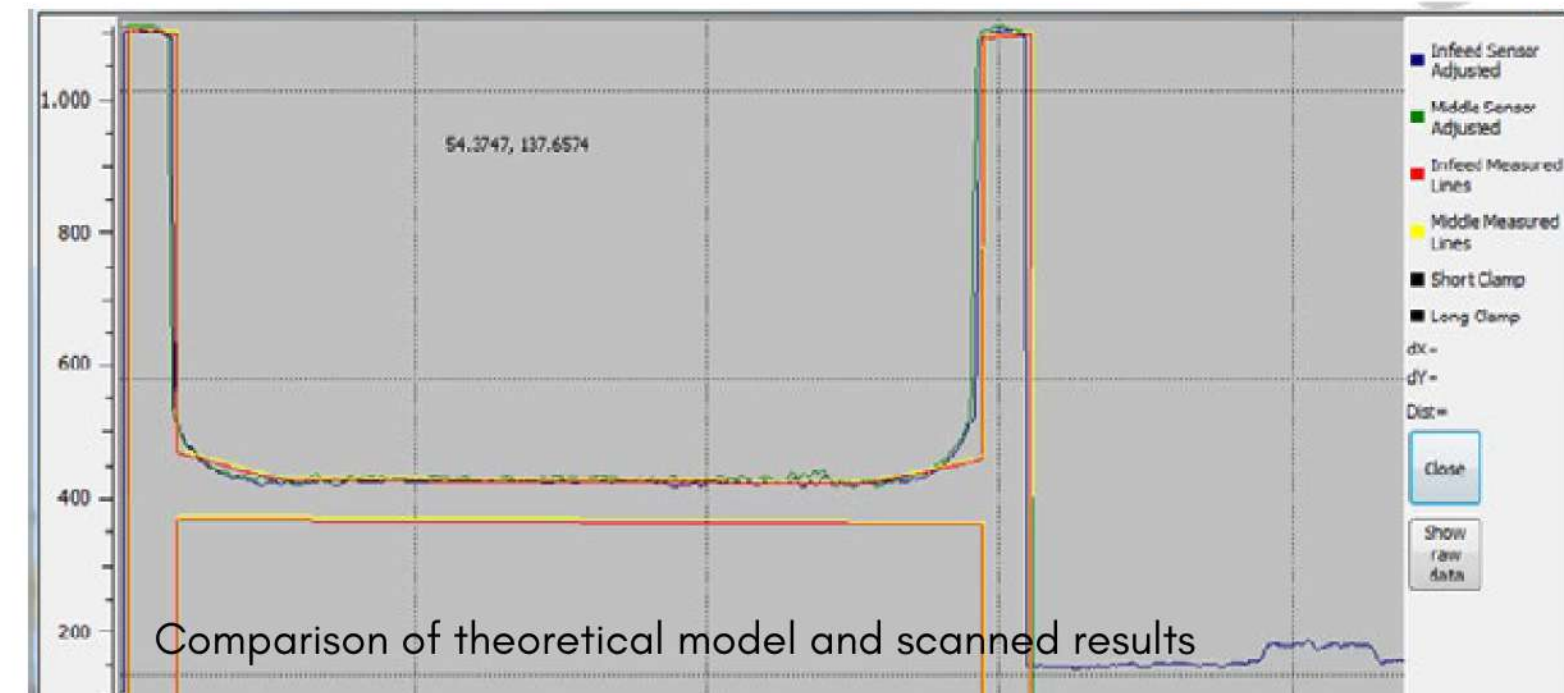
MATERIAL DISPLACEMENT AND DISTORTION COMPENSATION

The theoretical and actual position and shape of raw material differs. To achieve an accurate cut and to prevent collisions during cutting, the material has to be measured. Kaltenbach has succeeded in developing an accurate and rapid 3D measuring system which contributes to creating a highly productive and accurate cutting machine.

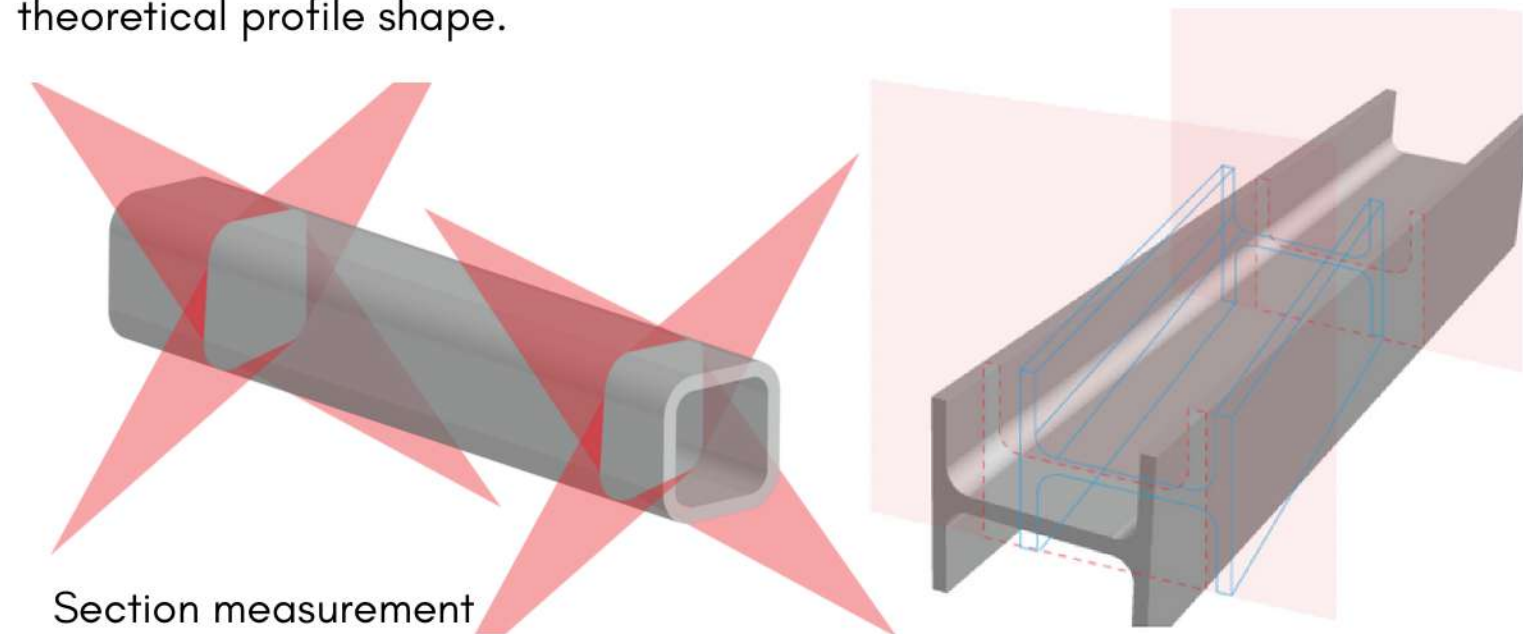
MEASUREMENT SYSTEM

The SUPERIOR KC 1221 is equipped with a measurement system to detect displacement of the material. The measuring system consists of a triangulation laser scanner that measures a section. This section measurement takes place at two positions on the material inside the cutting area. The scans of both sections are performed in one continuous cycle and can define distortions in position, torsion and flange or web angles between the two sections.

Since the SUPERIOR KC 1221 can cut end cuts of two parts at once, by interlinking cuts, only one 3D scan per profile is required after the initial scan. This saves time making the machine more productive. The laser is enclosed in a case for protection during cutting. The 3D scans can be viewed, giving the operator a reference of what has actually been measured and compares this data with the theoretical model.



In a matter of seconds a cutting sequence can be initiated with the alternative cutting path based on the measurement of the actual material rather than the theoretical profile shape.





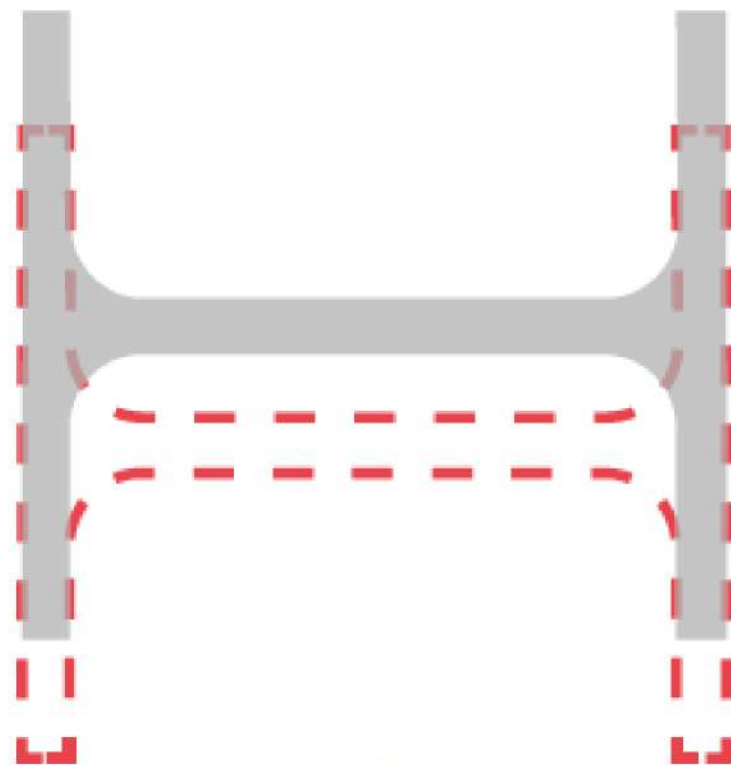
MATERIAL DISPLACEMENT AND DISTORTION COMPENSATION

POSITIONAL DISPLACEMENT AND TORSION

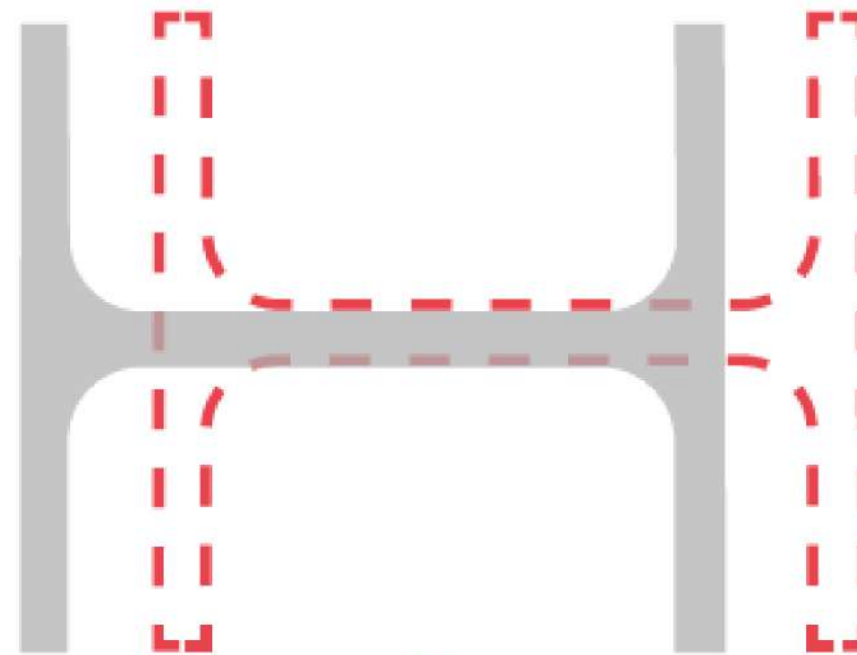
To achieve the most accurate cuts, the actual position of the beam will be measured in order to recalculate the cutting path of the profiling shape. The beam is measured at two positions to detect misalignment. The SUPERIOR KC 1221 measures offsets and torsion using both positions.

COMPENSATION OF POSITIONAL DISPLACEMENT AND TORSION

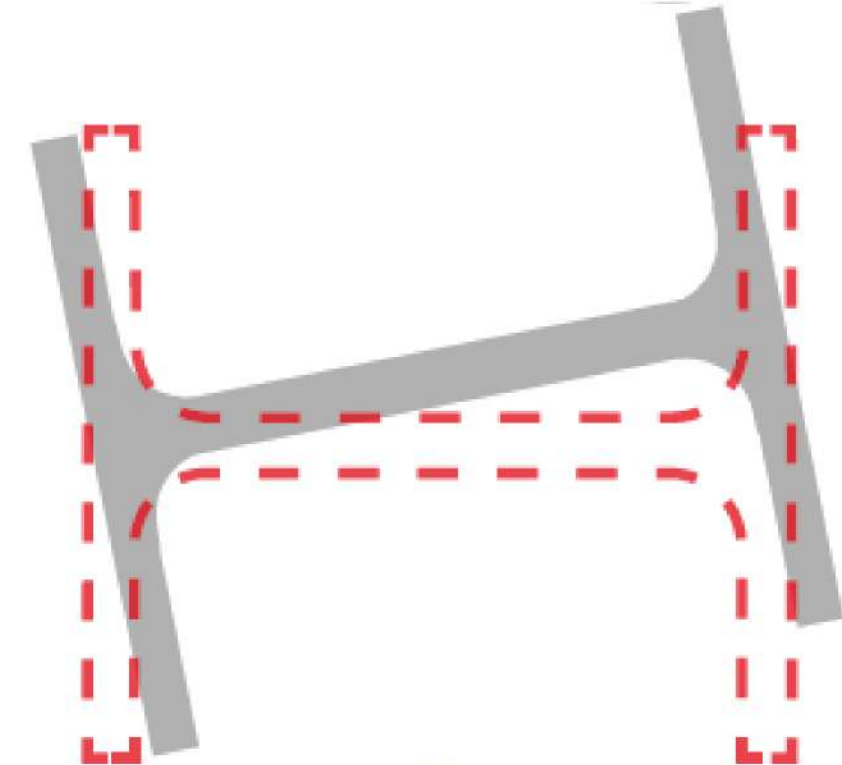
1. Sagittal offset
2. Transversal offset
3. Torsion



1



2



3

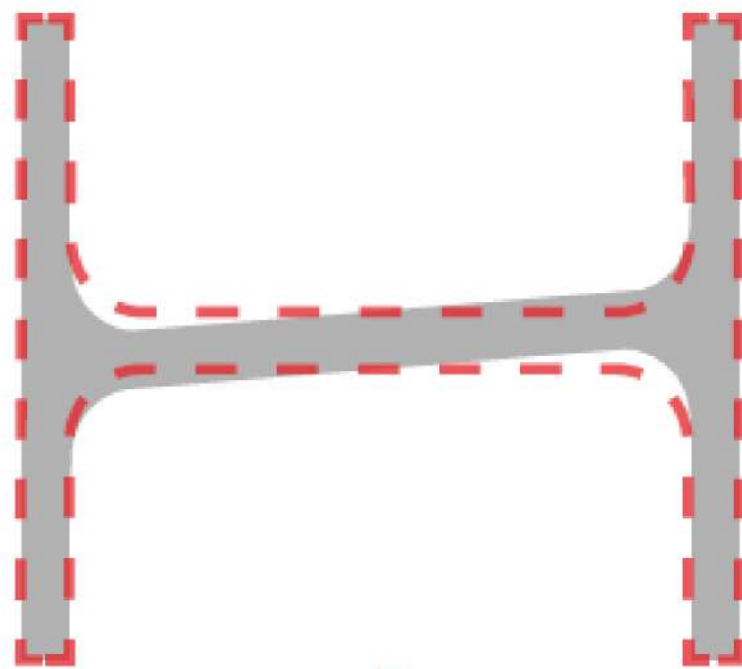
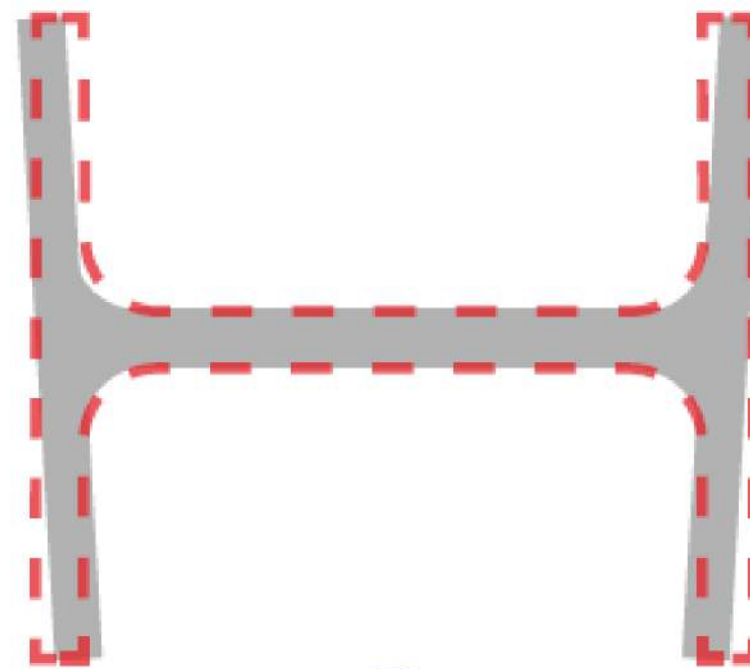
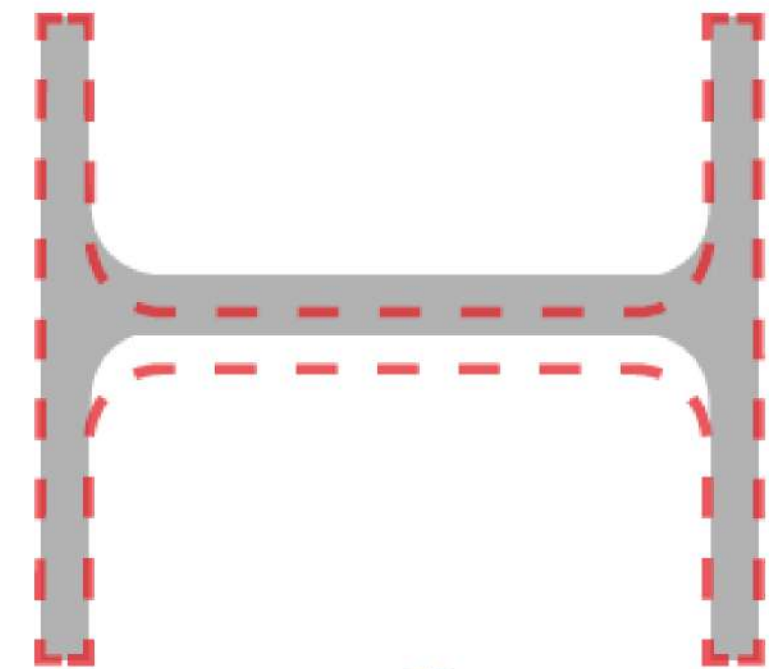
MATERIAL DISPLACEMENT AND DISTORTION COMPENSATION

SECTION DISTORTIONS

The section of a beam often has some kind of distortions compared with the theoretical section. To correct for these differences, the beam section will be measured to recalculate the defined cutting path.

COMPENSATION OF SECTION DISTORTIONS

1. Web not perpendicular
2. Trapezium flange
3. Off-centre web

**1****2****3**



FUME EXTRACTION AND FILTRATION

Plasma gasses can cause serious health problems and the fine particles can decrease the life span of the machine and its components. That is why all plasma cutting machines require a fume extraction and filtration system. Kaltenbach uses a fume extraction system that extracts from different positions which results in improved health, safety, operator visibility and technical life expectancy.

FUME EXTRACTION

Two extraction points in the top of the cutting cell create an upwards airflow inside the cutting cell. The air from the infeed and outfeed opening flows to the extraction points preventing fumes from escaping.

Tunnels on both the infeed and outfeed side of the cutting cell create an even bigger barrier for fumes to escape. Fume extraction has 3 distinct advantages:

- A clean working environment for the operator;
- Due to the optimised airflow the operator maintains a clear view through the cutting cell window of the cutting in operation without clouds of smoke blocking his view;



Fume extraction unit and particle filter



FUME EXTRACTION AND FILTRATION

- Extending lifespan. Plasma dust and high temperatures in the cutting cell are restricted to a minimum to prevent negative influences on the technical life expectancy of machine parts such as the clamping sensors and the robot.

FILTRATION

Kaltenbach recommends a dedicated filtration unit for each line to ensure the air flow is kept constant and prevent fumes and gasses from escaping.

SMOKE AND FUMES

The plasma cutting process can result in the release of hazardous substances, especially when cutting stainless steel or aluminium. The fume extraction and dust collection system removes smoke and fumes from the immediate cutting area. However, these units filter particles, they do not purify or filter the gasses.

The extracted gasses from the dust collector must be extracted and removed from the area according to local health and safety regulations. Kaltenbach recommends that these gasses are always released to the exterior.



Fume extraction channels inside the cutting cell



PLASMA CUTTING

Kaltenbach has distinguished itself as a pioneer in CNC plasma cutting. Since 1994, Kaltenbach has supplied over 500 3D profiling machines with plasma cutting technology worldwide and keeps innovating with plasma cutting technology to stay on top of the latest developments.

THE BASICS

An electric beam of superheated, electrically ionised gas, also called plasma, cuts through electrically conductive material (e.g. mild steel, stainless steel, various alloys).

The plasma beam follows the electric arc from the cutting torch to the earthed work piece. The electric arc ionises compressed gas (air, oxygen, hydrogen, nitrogen or argon) blown through a directed nozzle at high speed and the ionised gas is converted into a beam of plasma. The plasma and compressed gas blow the molten metal away to cut through the work piece.

High definition plasma equipment has a special torch design that swirls a protective gas (air or nitrogen, depending on the material to be cut) around the plasma beam to improve cutting quality.



A plasma torch cutting through the web of a beam profile



PLASMA CUTTING

VERSATILE

Plasma cuts through any electrically conductive material, allowing the cutting of a wide range of materials from mild steel to exotic alloys.

FAST

In the wall thickness range up to 25 mm, plasma cutting outperforms oxyfuel cutting. The exothermal process of oxyfuel cutting limits the cutting speed to between 350 and 800 mm/min. whereas plasma cutting can reach speeds of up to 3000 mm/min. Because plasma cutting requires no pre-heating before piercing, more time is saved on each individual cut.

PLASMA COSTS

Initial investment costs of plasma are higher than for oxyfuel. This is because, apart from the plasma source, a complete extraction system with filtering unit is required. The cost of monthly consumables is also more expensive than oxyfuel but this is compensated by the higher cutting speed which increases production.

HIGH QUALITY

Plasma cutting delivers a superior surface result over oxyfuel. Plasma also has a smaller heat-affected zone resulting in less distortion of the material's microstructure.

UNIQUE PLASMA FEATURES

Kaltenbach's machines and software allows for the following compensations of plasma characteristics which are unique to the industry and only available with Kaltenbach's machinery, made possible due to the fact that all software is developed internally by Kaltenbach.

EXTENDED CONSUMABLE LIFETIME

Kaltenbach developed interlinked cutting which connects several cuts to drastically decrease the amount of approaches and ignitions. A longer consumable lifetime is achieved in combination with the optimised pierce sequence.



PLASMA MARKING

Cutting machines produce a collection of individual parts ready for assembly. The fitter has to assemble all parts based on drawings. It is necessary to distinguish between parts and know their distance and orientation relative to each other. Kaltenbach offers several marking solutions for identification. Text marking can be used to identify parts or material. Some CAD packages can generate and include markings for layout in the cutting file.

TEXT MARKING FEATURES

TEXT MARKING

Some CAD systems can apply text to a part. For instance, Tekla Structures can add the text marking data to the NC1 file which can be imported by Kaltenbach's ProCAM for further processing.

MISCELLANEOUS TEXT MARKING FOR MDI

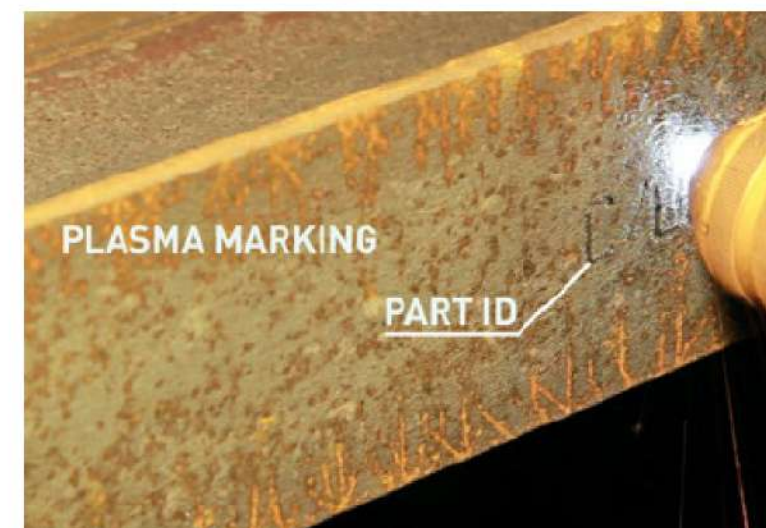
For marking of miscellaneous text like member names, projects, job numbers, etc., That are not member specific (e.g. 'This way up', weight or storage information). This feature is available as Manual Data Input.

TEXT MARKING BY SCRIPTING (ON REQUEST)

The unique 'ID name' used in CAD drawings can be marked on the member by a customer specific script. Additional information can also be marked if required (e.g. project title, job number, etc).

PERMANENT AND NON-PERMANENT MARKING

Kaltenbach supports permanent plasma marking for part identification that needs to persist after conservation. Non permanent marking is also available.





PLASMA MARKING

LAYOUT MARKING

Some CAD systems such as Tekla Structures support the export of layout marking data. Kaltenbach supports several kinds of layout marking data from CAD which can be applied to the part by plasma marking.

SECONDARY CONTOUR MARKING

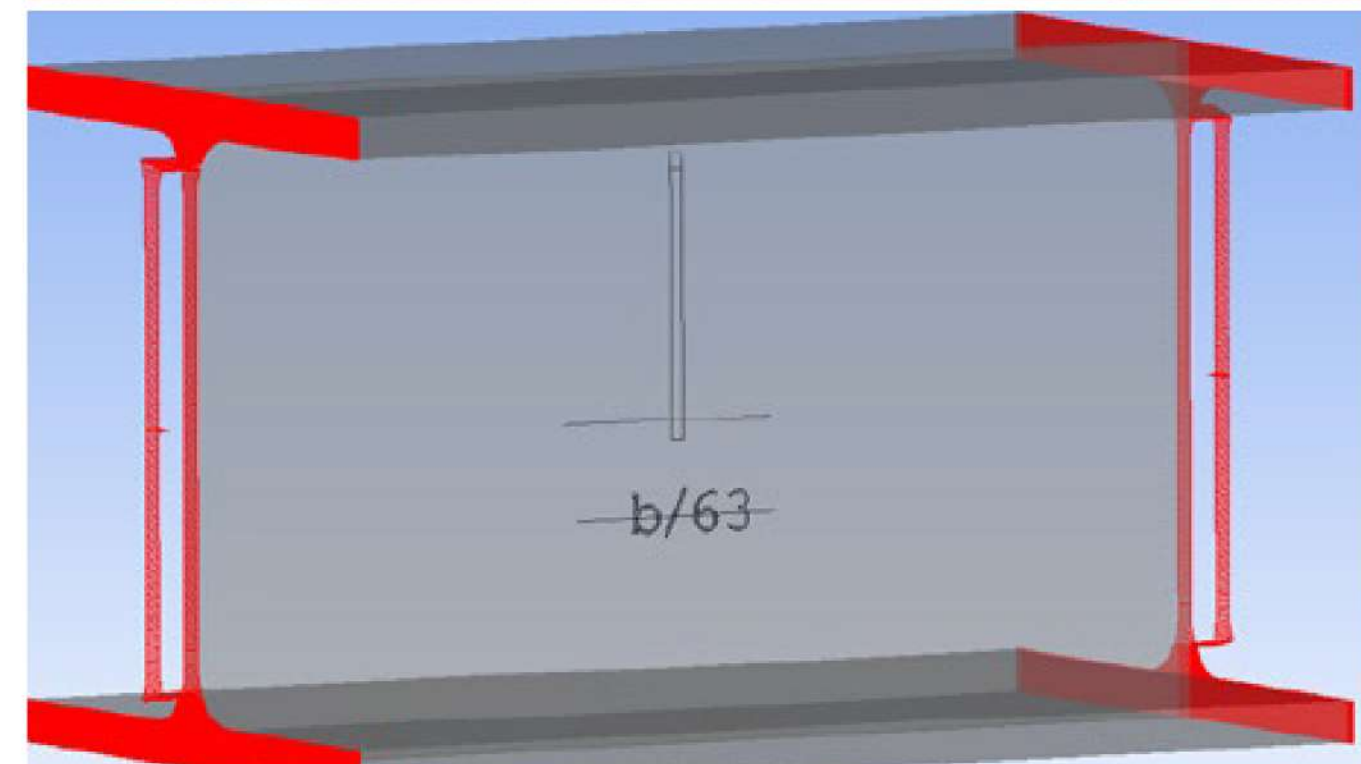
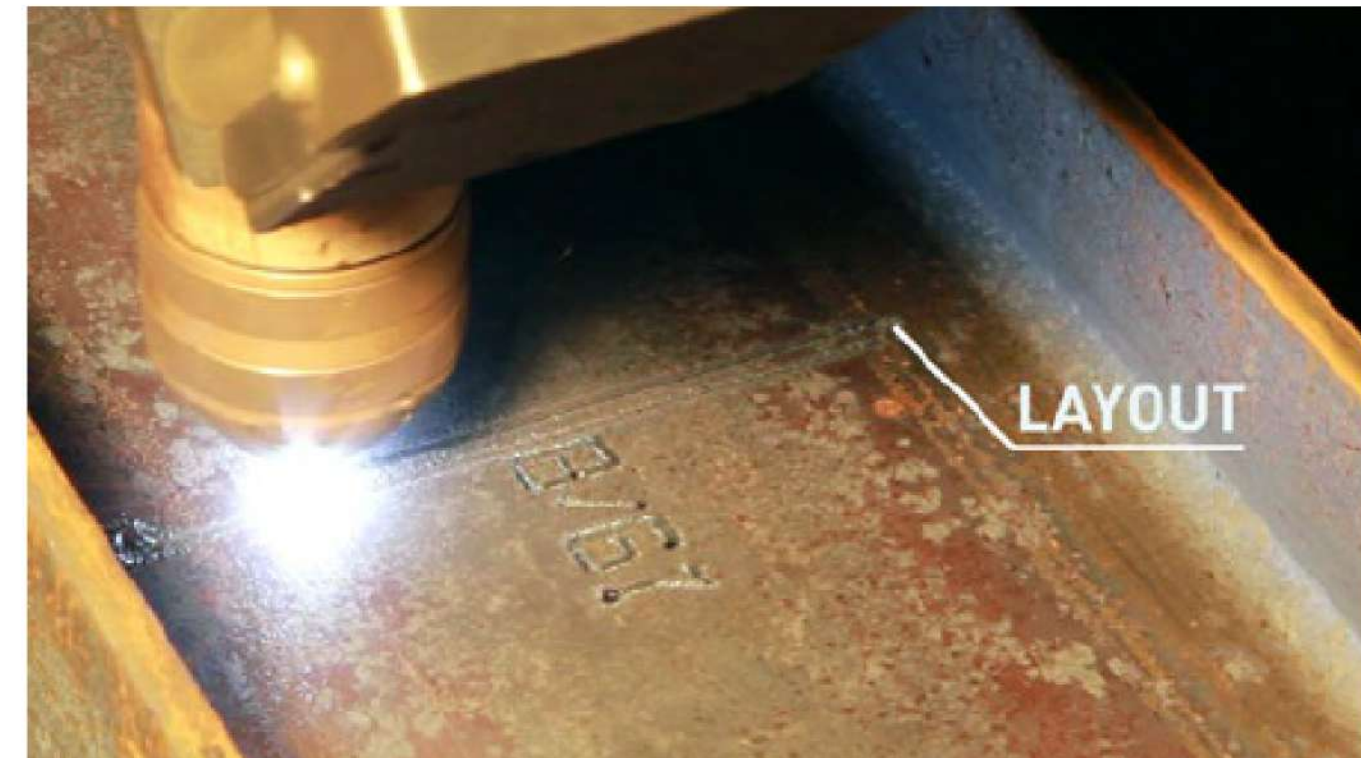
This marking indicates the footprint of a connecting secondary member on a main member for easy fitting. The footprint is also used to locate the surface to clean before welding.

SECONDARY NAME MARKING

ID marking of a secondary member on a main member fitting location. Preferably used together with secondary contour marking and text marking for marking of the member name.

FOUR SIDED MARKING

For H, I, U beams and box sections all four sides of the profile can be marked.



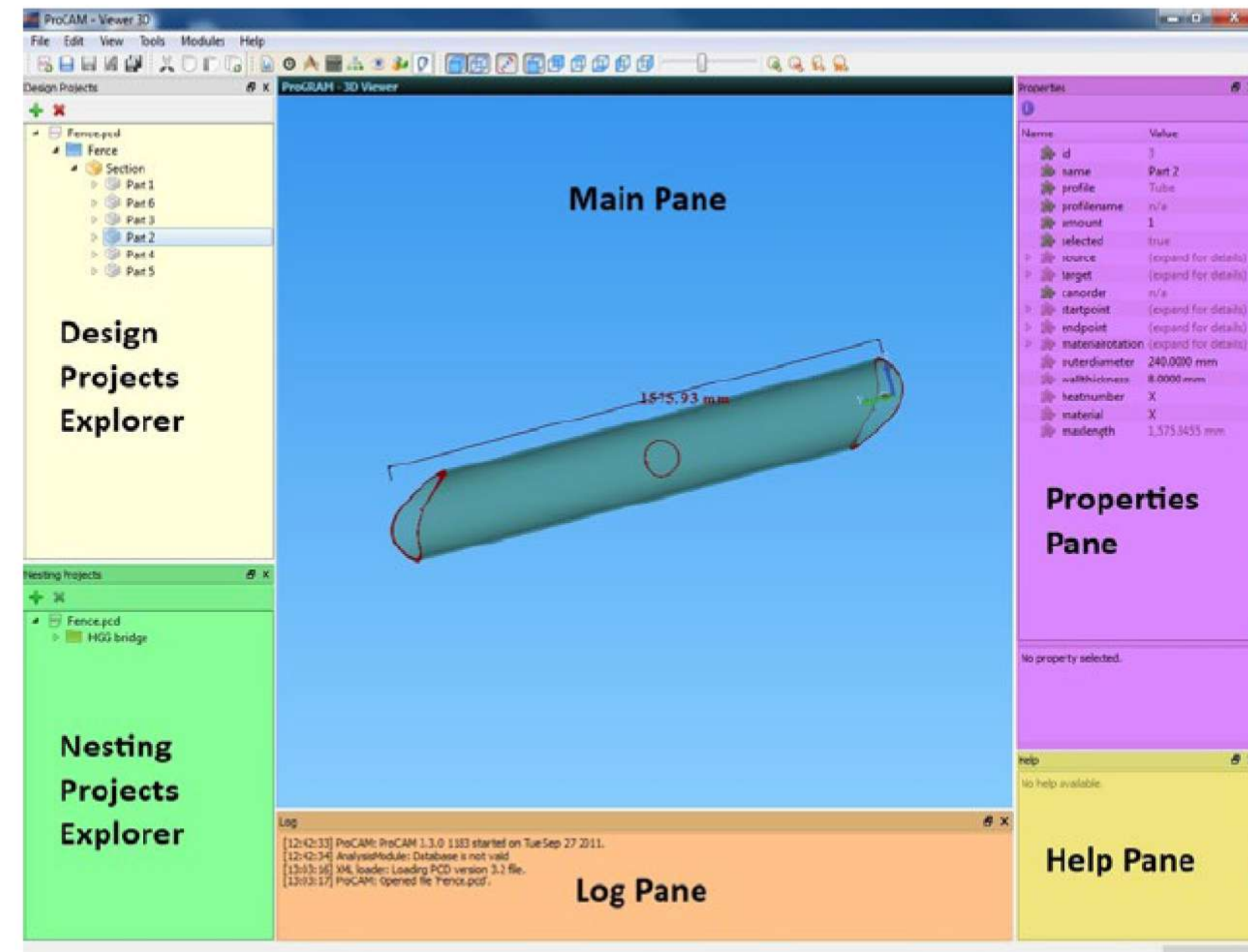


PROCAM SUITE

Kaltenbach has designed an extensive software suite that enables users to quickly and efficiently prepare jobs for Kaltenbach 3D profiling machines. The user can create and modify parts, review parts, set up the most efficient way to cut those parts from stock and automatically generate machine CNC data. The suite can also import project files generated with CAD packages.

THE SUITE

ProCAM is a constantly expanding and evolving suite that incorporates advances in technology and effectively responds to user needs and wishes. The latest additions provide vital information to optimise processes and enable various analysis options. Together these features lead to an optimal efficiency and substantial savings in materials and time as well as providing an excellent framework with effective calculation, estimation, planning and quality control. In combination with the Manual Data Input, Nesting and 3D Viewer modules for all aspects of structural design and preparation of materials for the cutting machines this suite provides an all-in-one solution.



User interface of ProCAM with the 3D Viewer visible



PLASMA MARKING

PROCAD: CAD/CAM INTERFACES

Kaltenbach provides interfaces that convert entire structures modelled in various CAD packages into CNC data files for the cutting machine without the need for further processing. Kaltenbach is proud to be a leading player to enrichment information through standardisation of all aspects of the industry from design to production and create greater collaboration within the industry.

The various interfaces link the existing CAD package to ProCAM providing unique functionality and editing capabilities, vital for the generation of the necessary cutting data. Tekla is the most commonly used CAD program to design structures.

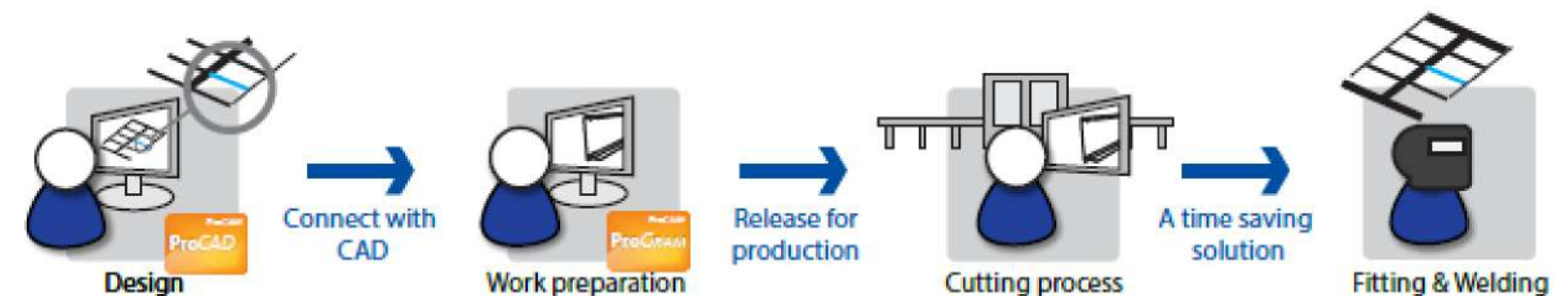
With only a few mouse clicks, you can transfer design data from Tekla to ProCAM. It's also possible to interface with solid modelling packages like Inventor and SolidWorks. Using the 3D viewer users are able to check cuts and parts before cutting data is generated.

PROGRAM

With this comprehensive package it is possible to design parts by manually entering data and program profiling information (MDI), view all the designed parts (3D Viewer) and divide them efficiently into the available raw materials (Nesting).

PROCAM OFFERS YOU

- Familiar, intuitive user interface;
- CAD/CAM interfaces to remove re-programming and errors;
- Manual programming interface with extensive profiling shapes library;
- 3D viewing of parts, cuts and nesting stock;
- Efficient nesting for fast cutting and material savings.





PLASMA MARKING

PROGRAM

ProGRAM is the standard set of software included with the cutting machine. With this comprehensive package it is possible to design parts by manually entering data and program cutting information (MDI), view all the designed parts (3D Viewer) and divide them efficiently into the available raw materials (Nesting).

MANUAL DATA INPUT

Program individual parts with all necessary parameters. The intuitive interface makes the programming of profiling shapes for welding and fastening simple and accurate.

Material types and sizes

The MDI module can define default shapes and dimensions, speeding up the whole design process. If materials with specific dimensions are regularly used you can define them as standards for fast and easy part creation.

Profiling Shapes

Kaltenbach has extensive library set of profiling shapes which are offered in a customised selection including the software. Profiling shapes are pre-defined software based tools to calculate cutting paths necessary for profiling. Profiling shapes contain a set of parameters to adjust the final cutting path. Each profiling shape has a help image that explains the parametric measurements. Invalid parts display a warning with an explanation of the problem for fast and efficient corrections.

3D Viewer

Generated with cutting data, this viewer provides three dimensional representation including welding preparations. Invalid parts are not displayed in the viewer. The 3D viewer can rotated move and magnify for close examination of the cutting path. The ProGRAM 3D Viewer visualises the entered data by displaying a three dimensional part and the specified cutting paths. A full check can be performed before nesting and creation of the cutting data.



PLASMA MARKING

NESTING MODULE

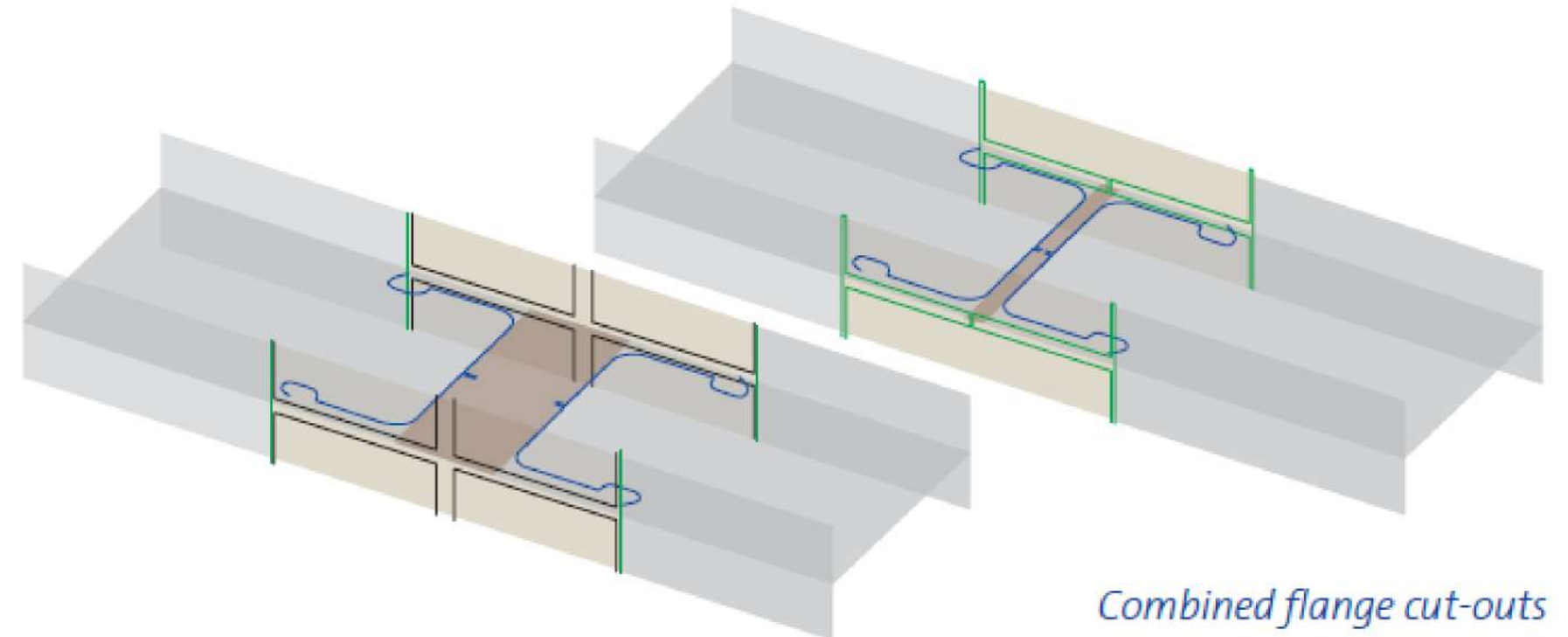
Optimised nesting places parts in their most cost-effective way in profiles to reduce waste and increase efficiency.

Combine flange cut-outs

The left nest in the figure above shows the black lined flange cut-outs required to make room for the torch to perform the web cut without collisions. The Kaltenbach technique 'combine flange cut-outs' combines the left and the right cut-out to one as viewed in the right nest above. This results in minimised scrap length represented by the brown colored surface. The interlinked cutting technique speeds up cutting by bundling required flange cuts into single cuts.

Reverse and turnover algorithm

Sloped or skewed end-cuts with complex copes can be very material consuming. The 'Reverse and Turnover' algorithm can nest parts by reversing and turning over parts in a different order to reduce scrap to a minimum.



Optimised nesting according to reverse and turnover algorithm

PLASMA MARKING

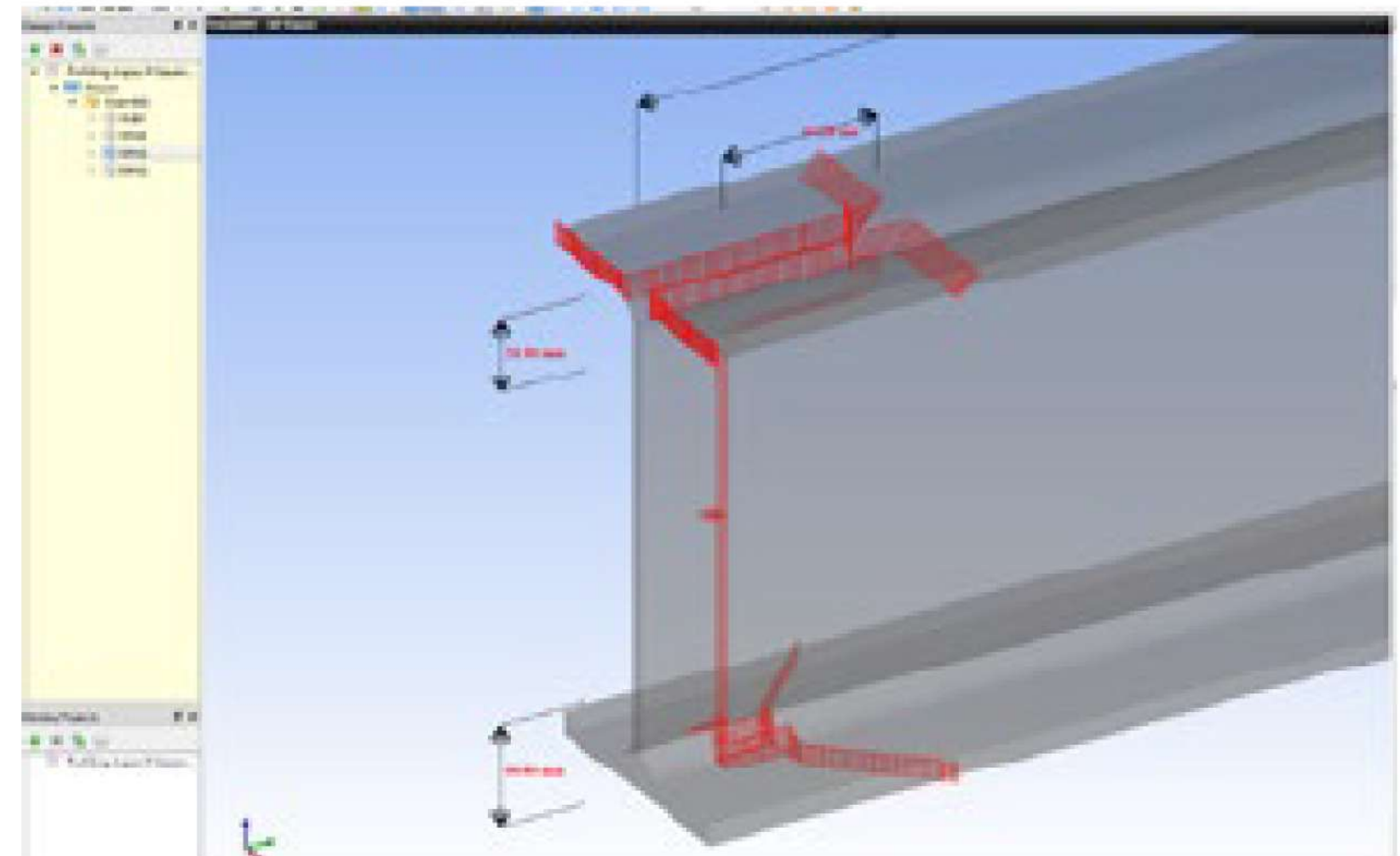
Stitch cutting

Sometimes it's difficult to handle and store parts of different sizes and lengths efficiently. Keeping parts stitched together with a custom cutting routine can lower the crane or fork lifting need because profiles keep their original length. Handling will not interfere with the machine throughput nor become a bottleneck. Another benefit is easy processing of extremely short parts. Some rework (cutting the stitches through) is necessary to separate the parts.

Reports

ProGRAM provides access to a range of reports that provide detailed information about the project. These can be used to keep records of the production, to monitor the machine or as a management/planning tool to optimise production:

- Nest report: Shows nesting of the parts in the stock items;
- Batch report: Details about nest jobs once it is divided into stages;
- Group report: Details about nest jobs for post production purposes;



Parametrically defined profiling shape



PLASMA MARKING

- Rest length report: Overview of the remaining stock after cutting;
- Cutting list: All the necessary information for part cutting and quality control.

PROGRAM OFFERS YOU

ProGRAM provides access to a range of reports that provide detailed information about the project. These can be used to keep records of the production, to monitor the machine or as a management/planning tool to optimise production:

- Manual Data Input with a wide variety of profiling shapes and detailed parameter drawings;
- Unique visualisation with the 3D Viewer giving exact representations of parts;
- Easy to use Nesting Module increasing efficiency and reducing scrap and production time;
- Reporting for detailed information about the nest project.

Nest report

di 8 december 2015, 11:07:48

Project: Nest Project
Job: Nest Job

Profile properties

Type: H-Beam
Weblength: 290,00 mm
Flangethickness: 14,00 mm
Number of parts: 10

Material: S235JR
Webthickness: 8,50 mm
Radius: 27,00 mm

Profile name: HE300A
Flangelength: 300,00 mm
Number of stockitems: 1



Auto Stock, length: 12.000,00 mm, rest length: 1.878,00 mm, clamping length: 0,00 mm, heatnr: X

1. b-5(10)	5. b-5(6)	9. b-5(2)
2. b-5(9)	6. b-5(5)	10. b-5(1)
3. b-5(8)	7. b-5(4)	
4. b-5(7)	8. b-5(3)	

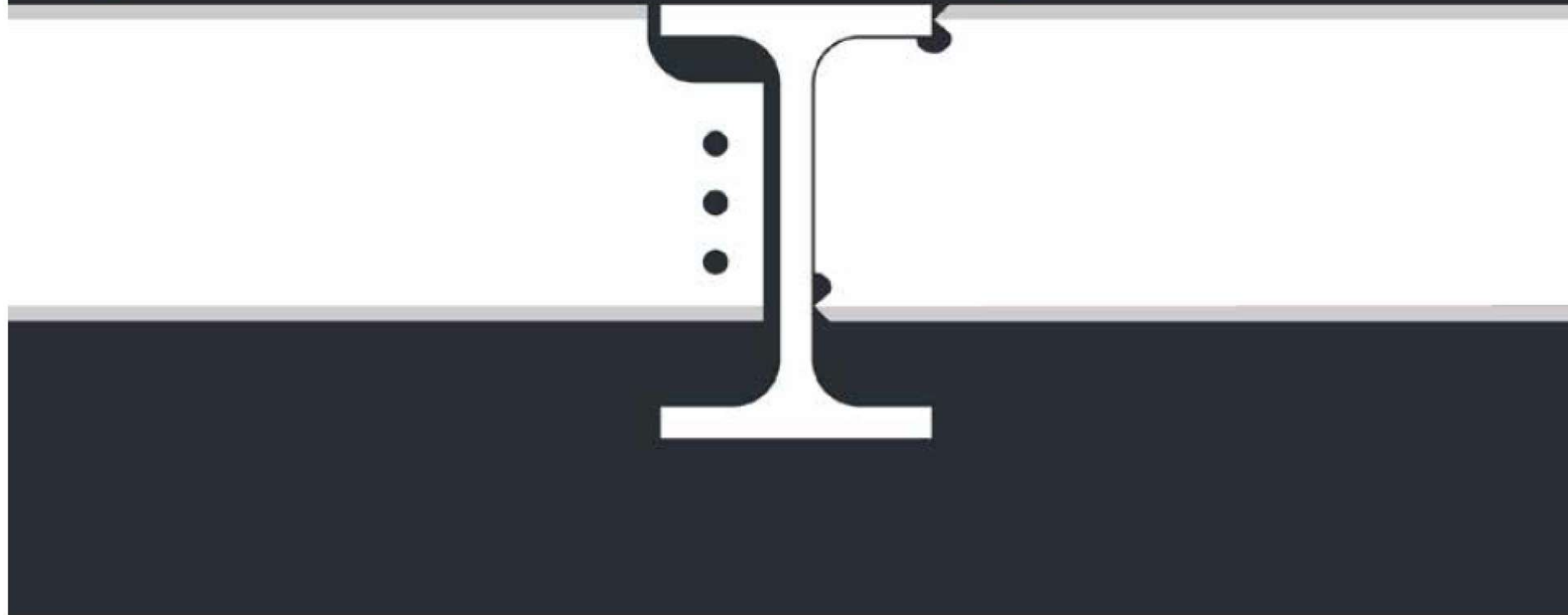
Nest report from ProCAM



**SPECIALIST
MACHINERY
SALES** AUSTRALIA, NEW ZEALAND & SE ASIA

> Bolted connections

> Welded connections



Unlimited work preparation of beams and bars



UNLIMITED WORK PREPARATION OF BEAMS AND BARS

Design and detailing of a structure was limited by the fabrication process. With the 3D profiling capabilities of our machines, you are welcomed to the world of complete fabricating freedom. We provide explanation of limitations and examples of parts with commonly used cuts to provide an insight of the unlimited possibilities.

PART PROGRAMMING

Kaltenbach offers 3D profiling of parts based on complete freedom to design. The cuts represented in this document are supported by the following Kaltenbach modules:

- Manual Data Input (MDI)
- CAD/CAM Interface for model-based design software such as Tekla Structures (.DSTV files).
- CAD/CAM Interface for solid modelling software such as SolidWorks (.step files).

WHAT IS A CUT?

A cut is shown as an outlined box representing a commonly used shape with weld preparation functions which are used in all industries using beams and bars. Three types of cuts can be distinguished:

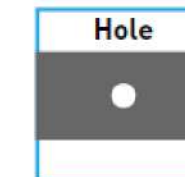
A flange end cut (top view)



A web end cut (side view)



An intermediate cut



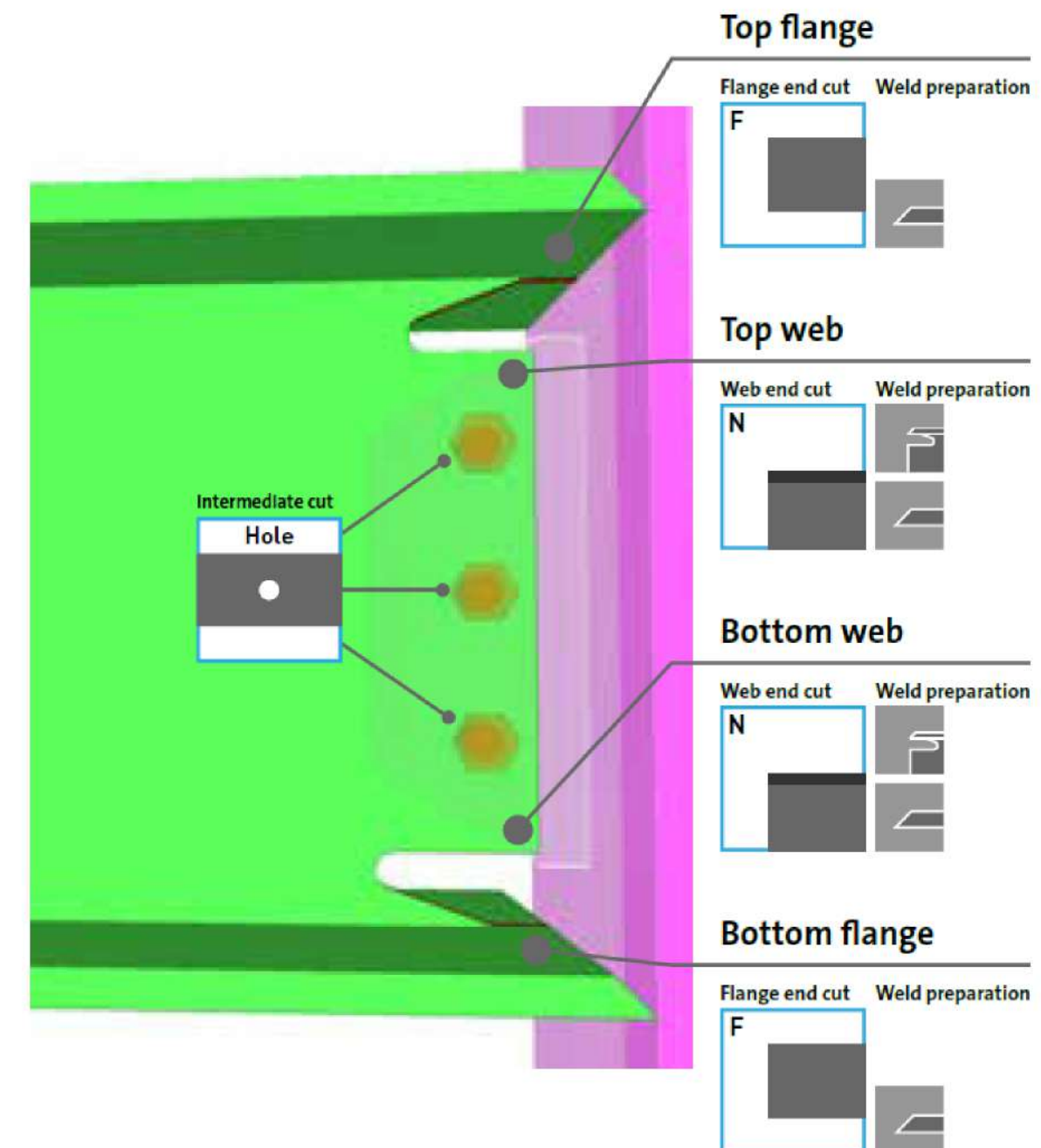


UNLIMITED WORK PREPARATION OF BEAMS AND BARS

A PRACTICAL EXAMPLE

To help with understanding the structure of this document. Cuts are available for end shapes, holes and cut-outs. Four cuts are needed to define a beam end shape.

Top flange, top web, bottom web and bottom flange. The weld preparation is visualised right next to the cut. Holes can be added wherever they are required.

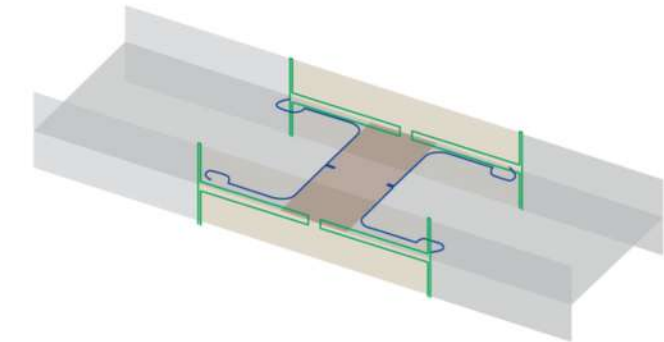




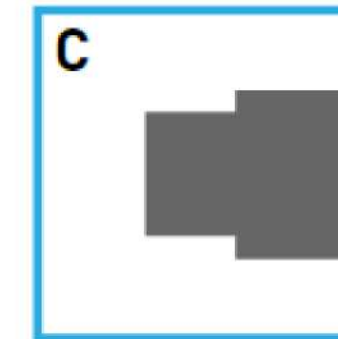
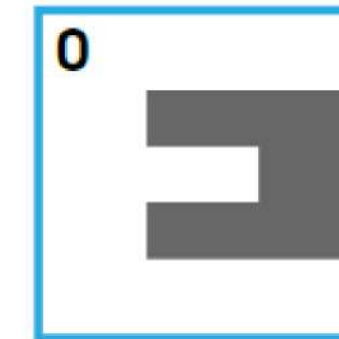
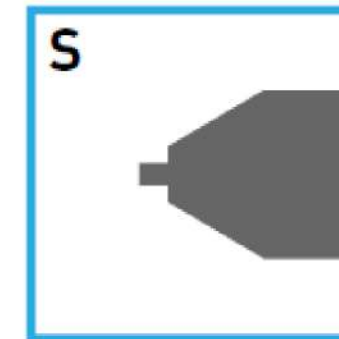
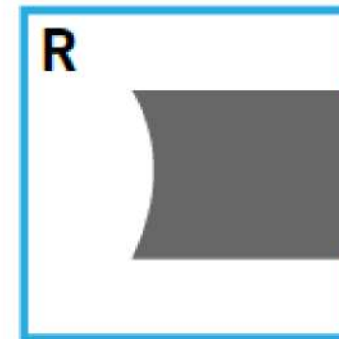
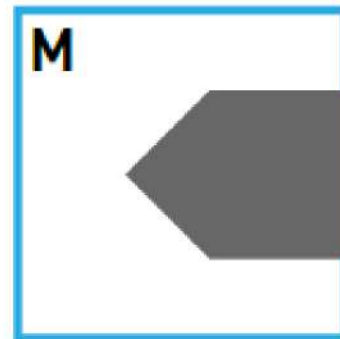
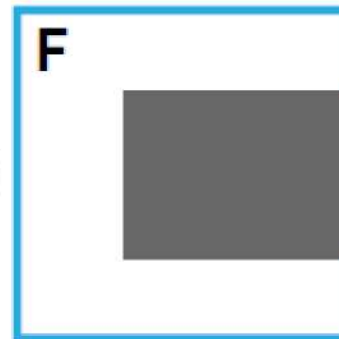
CUTS FOR END SHAPES

FLANGE CUTS FOR PART ENDS

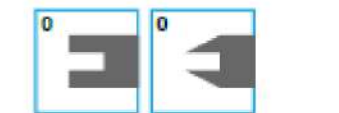
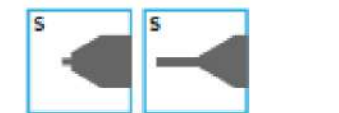
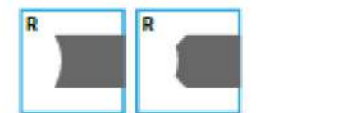
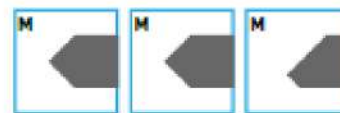
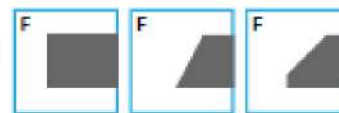
These six flange cuts can be applied to define the flange of a part. Half of the cut displayed in the top view works for channels and angle bars.



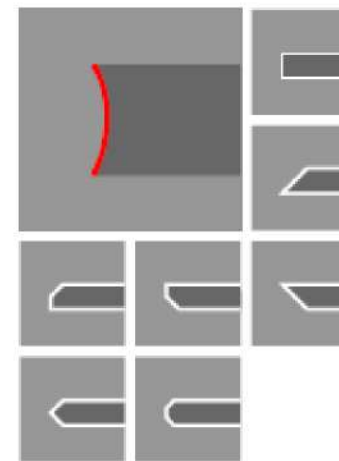
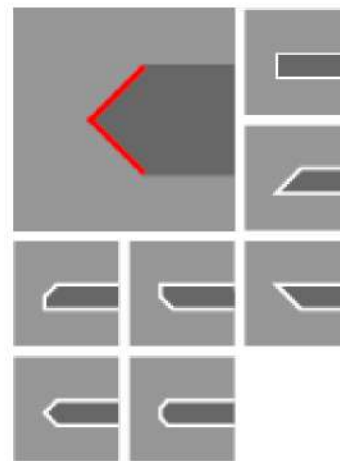
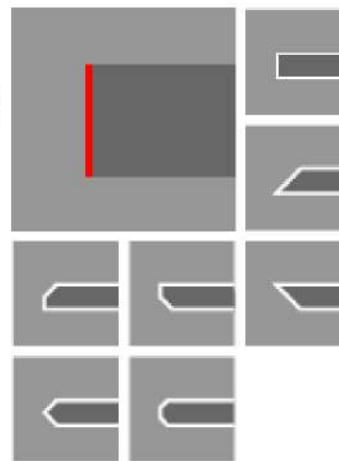
CUTS (TOP VIEW)



INCLUDED SHAPES



INCLUDED BEVELS



Cut



Weld preparation detail.



Rathole possible.



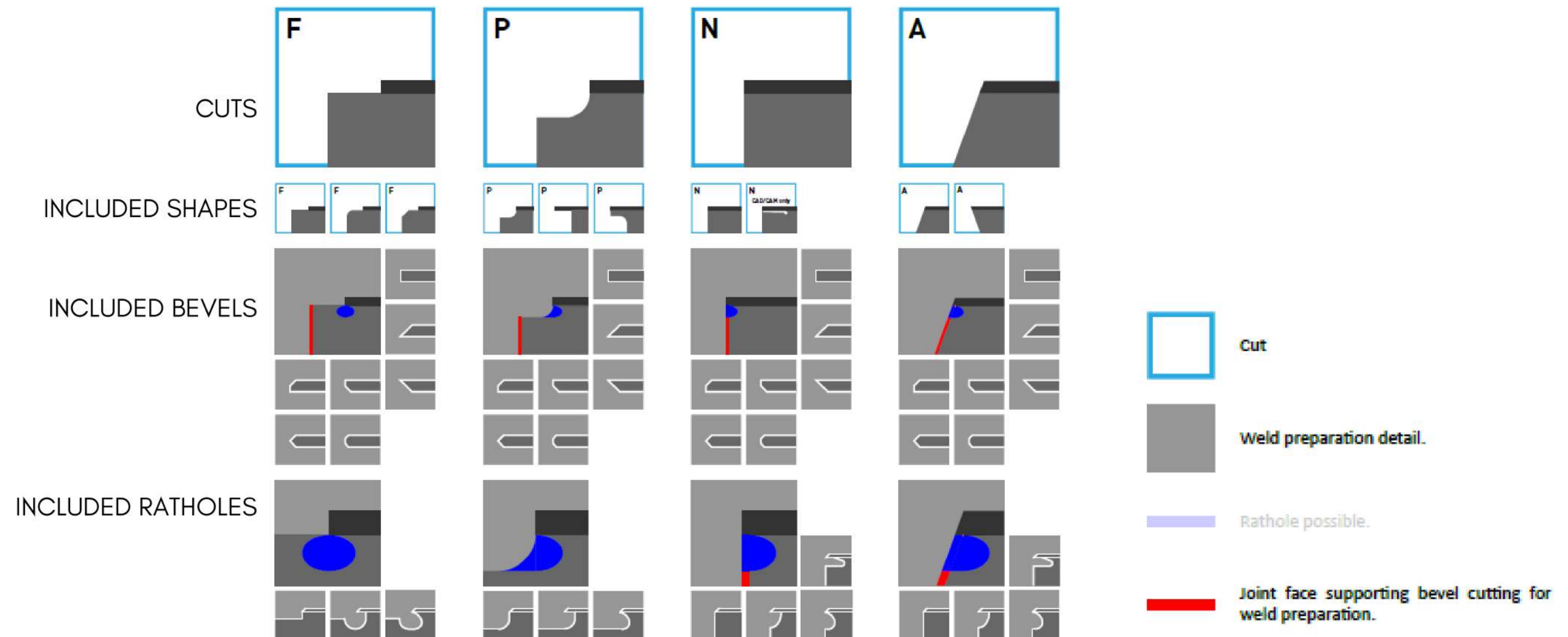
Joint face supporting bevel cutting for weld preparation.



CUTS FOR END SHAPES

WEB CUTS FOR PART ENDS

These four side viewed flange cuts can be applied to define half of the web of a part. One for the top flange and one for the bottom flange is necessary for channels or beams.





CUTS FOR INTERMEDIATE SHAPES



Cut



Weld preparation detail.



Rathole possible.

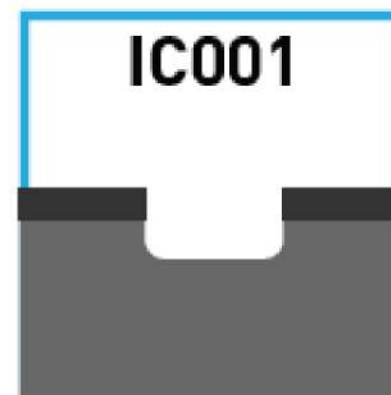


Joint face supporting bevel cutting for weld preparation.

WEB CUTS

This cut covers both the flange and web.

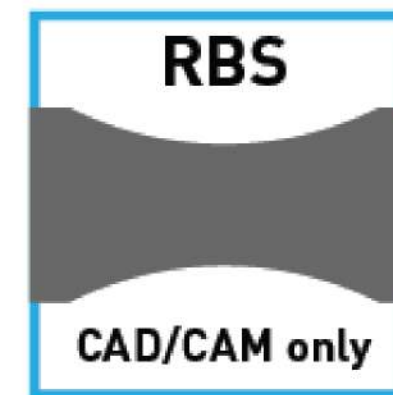
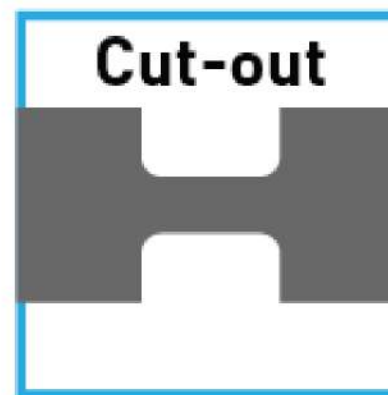
CUTS



INCLUDED SHAPES

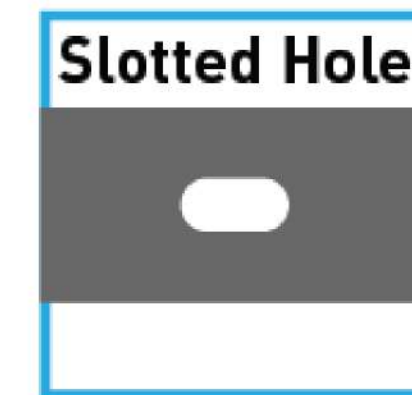
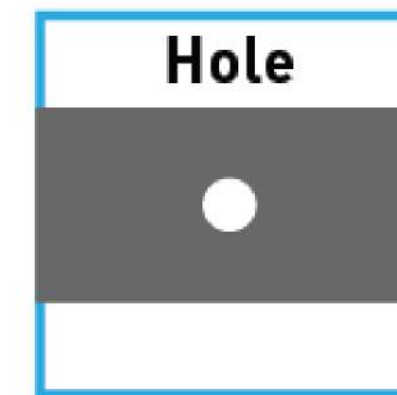
FLANGE CUTS

These cuts are primarily used for flange reductions.



UNIVERSAL CUTS

These cuts can be applied to both the flange and web.

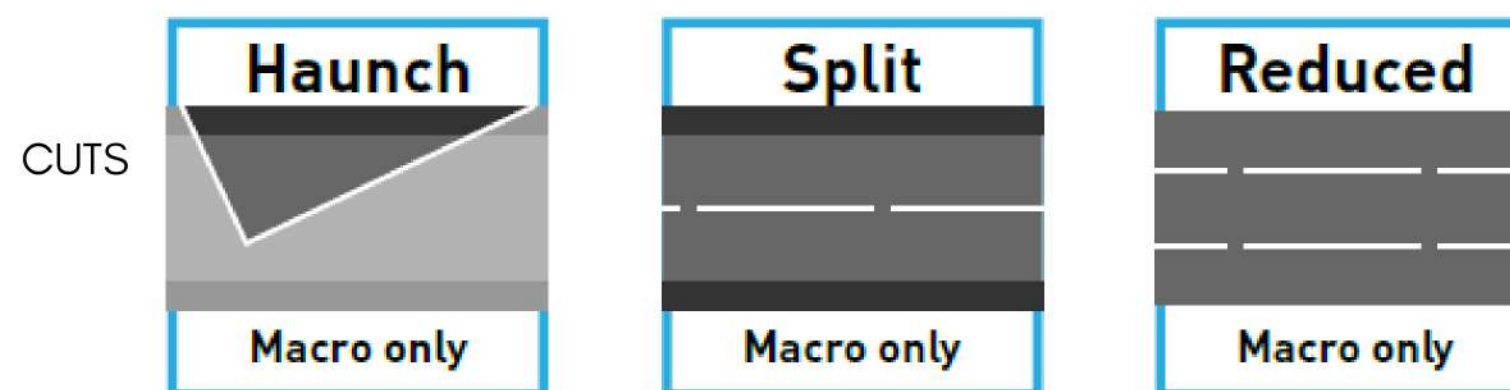




CUTS FOR LENGTH SHAPES

WEB CUTS

Cuts for shapes in longitudinal direction.



INCLUDED SHAPES



Cut



Weld preparation detail.



Rathole possible.



Joint face supporting bevel cutting for weld preparation.



GUIDE TO WELD PREPARATION

Kaltenbach develops machines to cut copes and weld preparations with a wide variety of bevel types.

BEVEL CUTTING

Bevels are applied to ends of profiles to create a position where welds can be applied. Bevels come in different variants and all can be cut with Kaltenbach equipment.



NO BEVEL

Preferred in case of bolted connections or to apply fillet welds.



SINGLE GROOVE

Bevel cut for groove weld. Weld preparation on top side or bottom side.



SINGLE GROOVE WITH NOSE

Bevel cut for groove weld with broad root face. Weld preparation on top side or bottom side.



DOUBLE GROOVE

X-bevel cut for X or K groove welds. Small root face can be applied after cutting.



DOUBLE GROOVE WITH NOSE

X-bevel cut for X or K groove welds with broad root face.



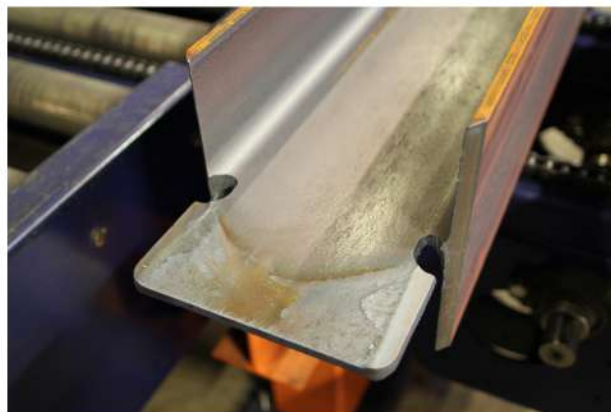


GUIDE TO WELD PREPARATION

COPEES AND RATHOLES

Copes are usually performed without bevels. A rathole is an open hole in the web right up against the flange that allows continuous weld passes on flange joints across the web with complete joint penetration. The necessary reduction in the web avoids defects like discontinuities, inclusions and incomplete weld penetration. Ratholes enable nondestructive testing of the full joint.

Not applying ratholes avoids reduction of the web but possible defects need to be taken into account during strength calculation.



COPEES

Without weld preparation and cut for construction purposes.



NONE

No reduction in web section for full strength. Nondestructive tests of welds across the web are impossible.



TYPE 1

Traditional rathole. Requires some grinding due to the required torch to flange distance for web cuts.



TYPE 6

Kaltenbach's optimised rathole. Grinding after cutting is not necessary due to optimised cutting path.



AWS 6.2

With weld inspection hole for seismic moment connections (CAD-CAM only).

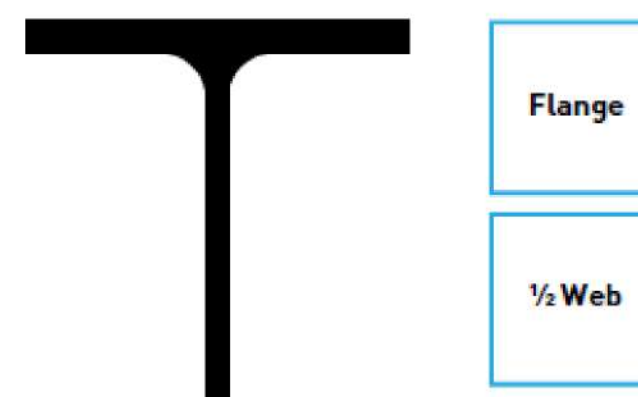
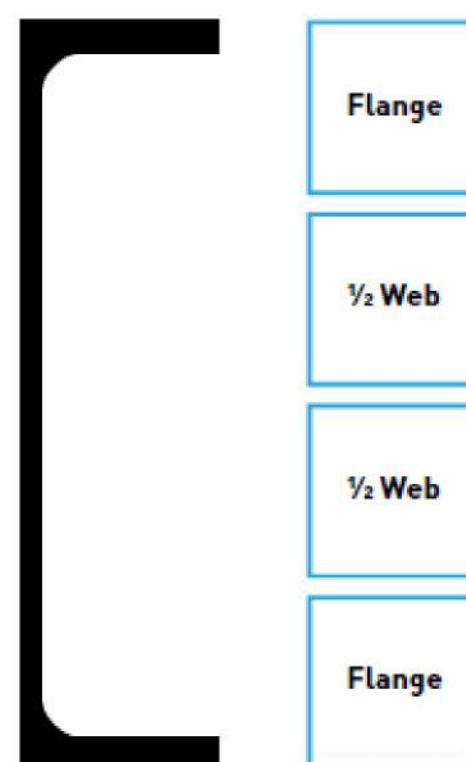
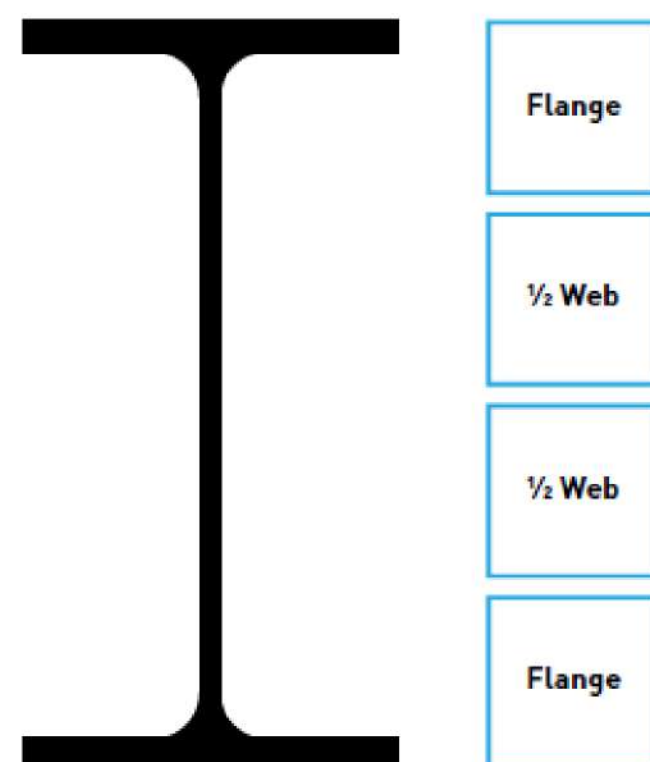




END SHAPE CONFIGURATION

A group of four cuts is needed to define the end shape of a part. This group represents flange cuts and half web cuts for the top flange, top web, bottom web and bottom flange. A group of only two cuts is needed for T-bars and angle bars. Intermediate cuts like holes can be applied additionally.

Kaltenbach supplies a selection of grouped cuts for manual programming of common end shapes. Contact us to enquire whether this selection fits your requirements.

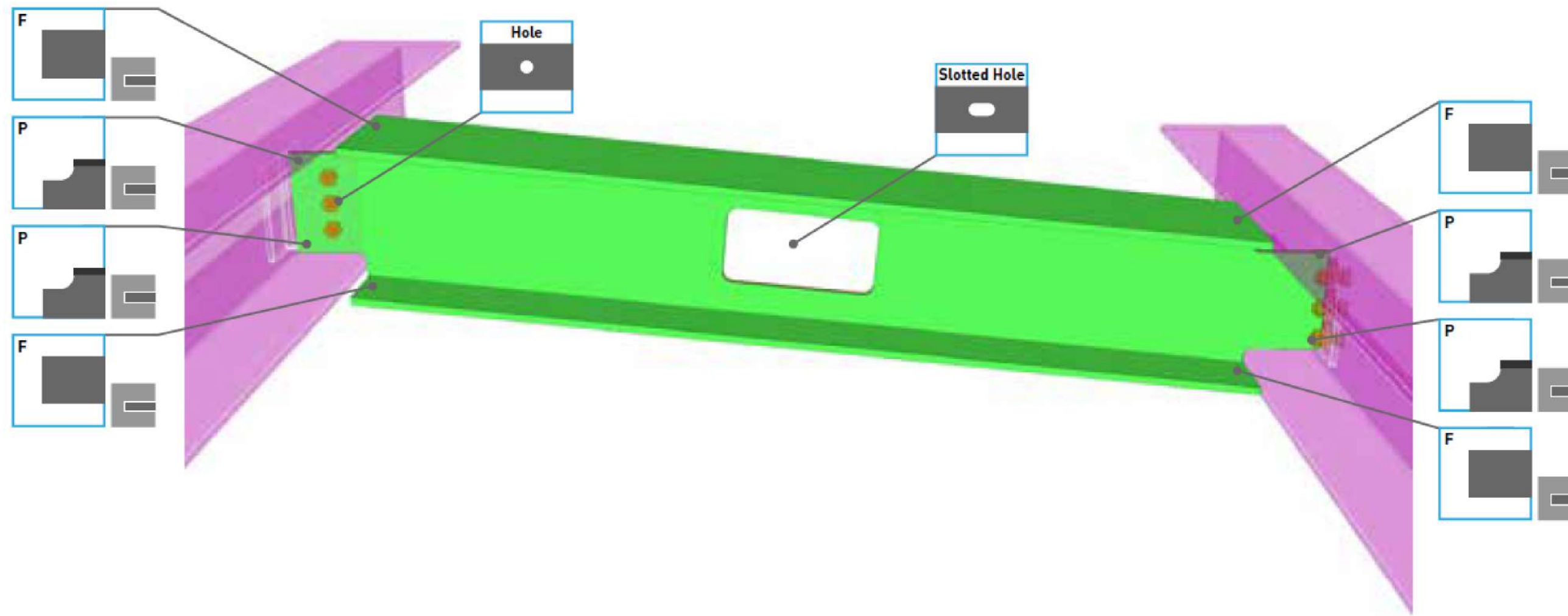


EXAMPLE 1

A bolted beam to beam connection, sloped shear tab connection with notches and an intermediate.

An intersection.

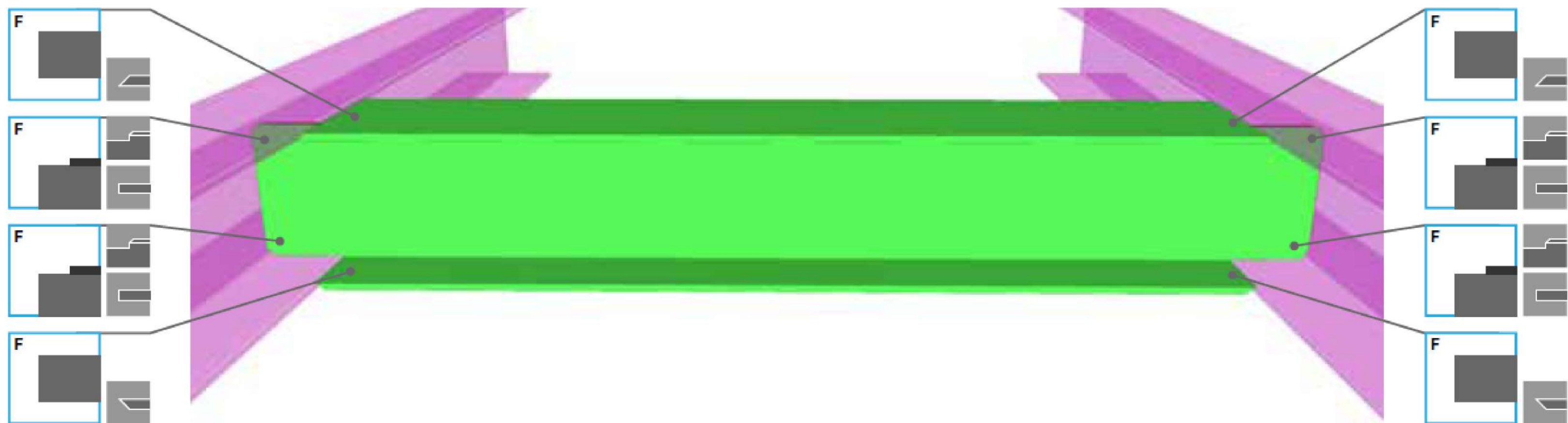
A bolted beam to beam connection, sloped with web end plate and notches.





EXAMPLE 2

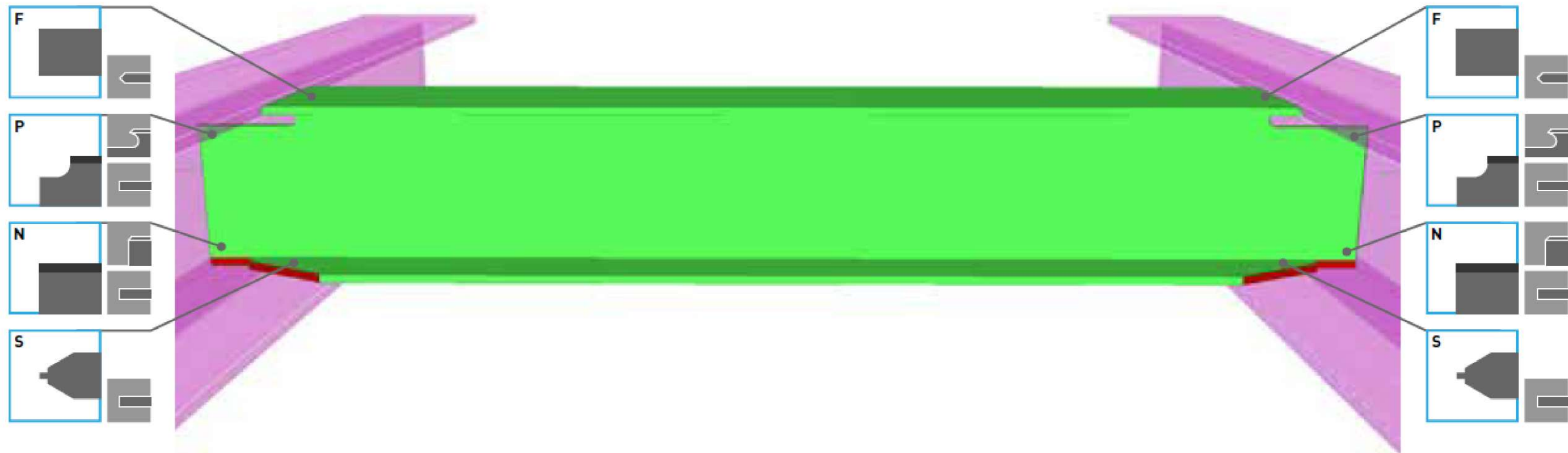
A welded beam to beam connection, fully fixed for high performance steel structures.





EXAMPLE 3

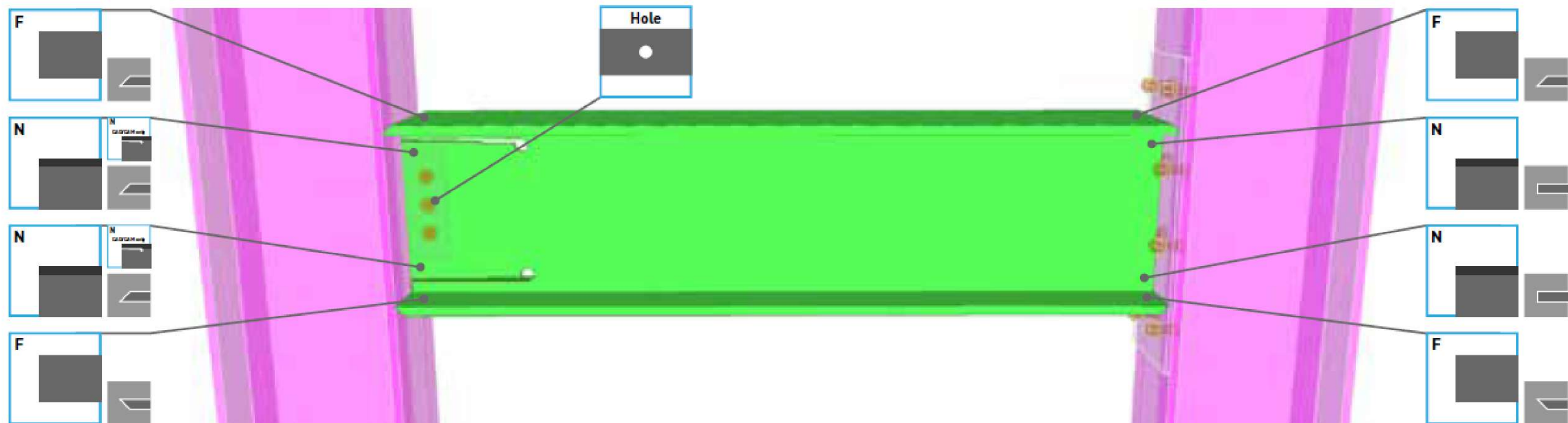
A welded beam to beam connection, pinned with snipe for supporting members in high performance steel structures.



EXAMPLE 4

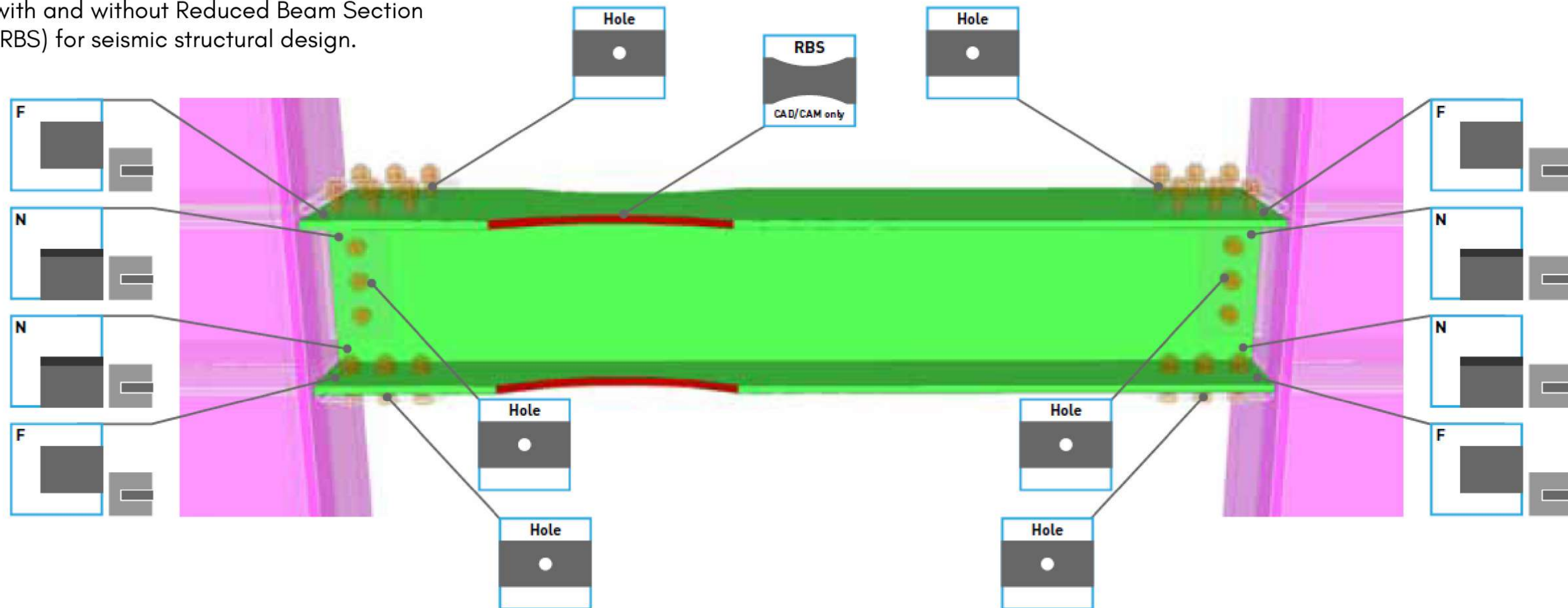
A bolted and welded column to beam connection, slotted web (SSDA) moment connection for seismic structural design.

A bolted column to beam connection, with extended end-plate moment connection.



EXAMPLE 5

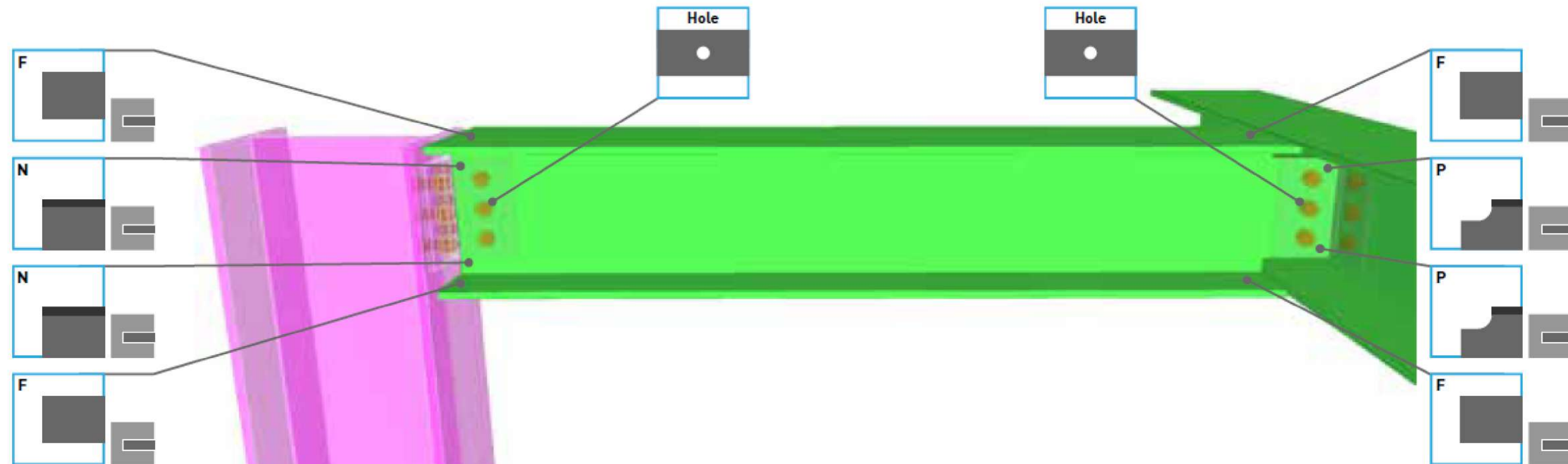
Bolted beam to beam connection, Bolted Flange Plate (BFP) moment connection with and without Reduced Beam Section (RBS) for seismic structural design.



EXAMPLE 6

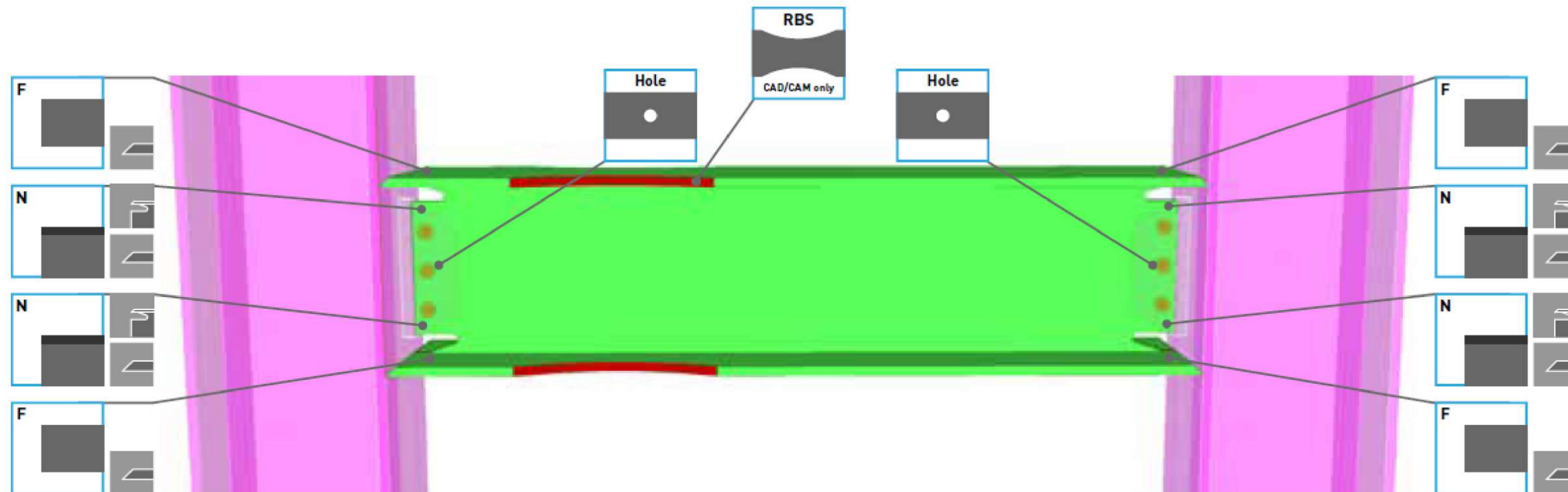
A bolted column to beam connection,
shear tab connection without notches.

A bolted beam to beam connection,
shear tab connection with notches.



EXAMPLE 7

A bolted and welded column to beam connection, Welded Un-reinforced Flange-welded Web (WUF-W) moment connection with and without Reduced Beam Section (RBS).



TERMINOLOGY

INTERSECTION GEOMETRY

SKEW

Acute angle between member axes in the horizontal plane.

SLOPE

Acute angle between member axes in a vertical plane. Also called 'inclination'.

SHAPE

Actual geometry to create the end cut, cut-out or hole for a proper fit.

WELD PREPARATION

GROOVE ANGLE φ

The angle between opposing faces of the connected parts which create a groove to be filled with weld materials.

BEVEL ANGLE β

The angle formed between a centerline perpendicular to the wall and the cut face of the wall. The bevel angle is equal to the cutting angle and can be negative or positive.

- A perpendicular cut has $\beta=0^\circ$;
- Largest β plasma is 45° (- or +).

DIHEDRAL ANGLE ψ

Angle between the outer faces of the connected walls. Calculations for optimal weld preparation are based on ψ .

ROOT OPENING (R)

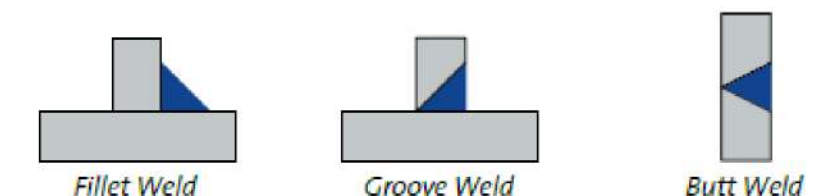
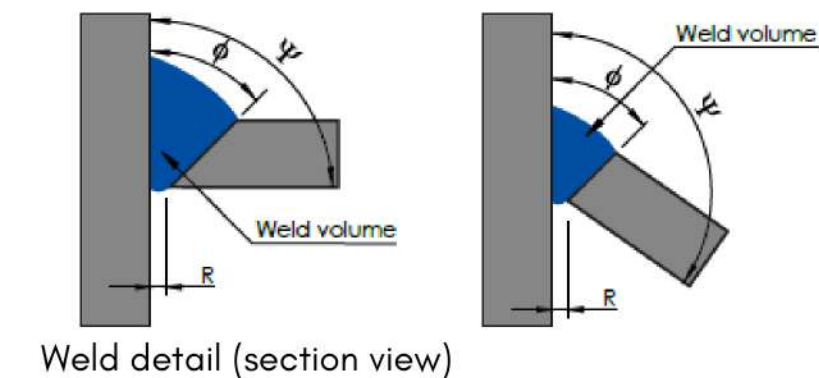
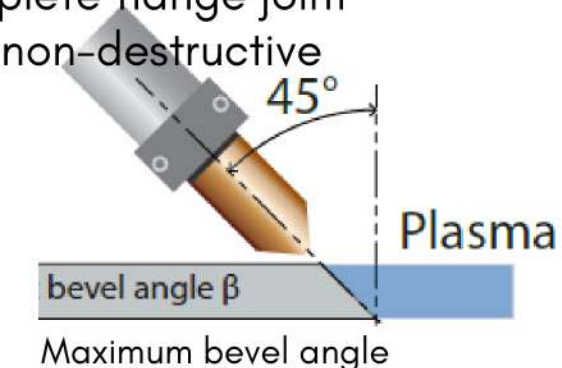
The separation at the joint between the walls after fitting. Root openings are used to increase the joint penetration, resulting in stronger connections.

RATHOLE

An opening in the web right under the flange to achieve complete flange joint penetration and allow non-destructive testing of these welds.

WELD TYPES

- Fillet weld
- Groove weld
- Butt weld



BOX SECTION CUTTING

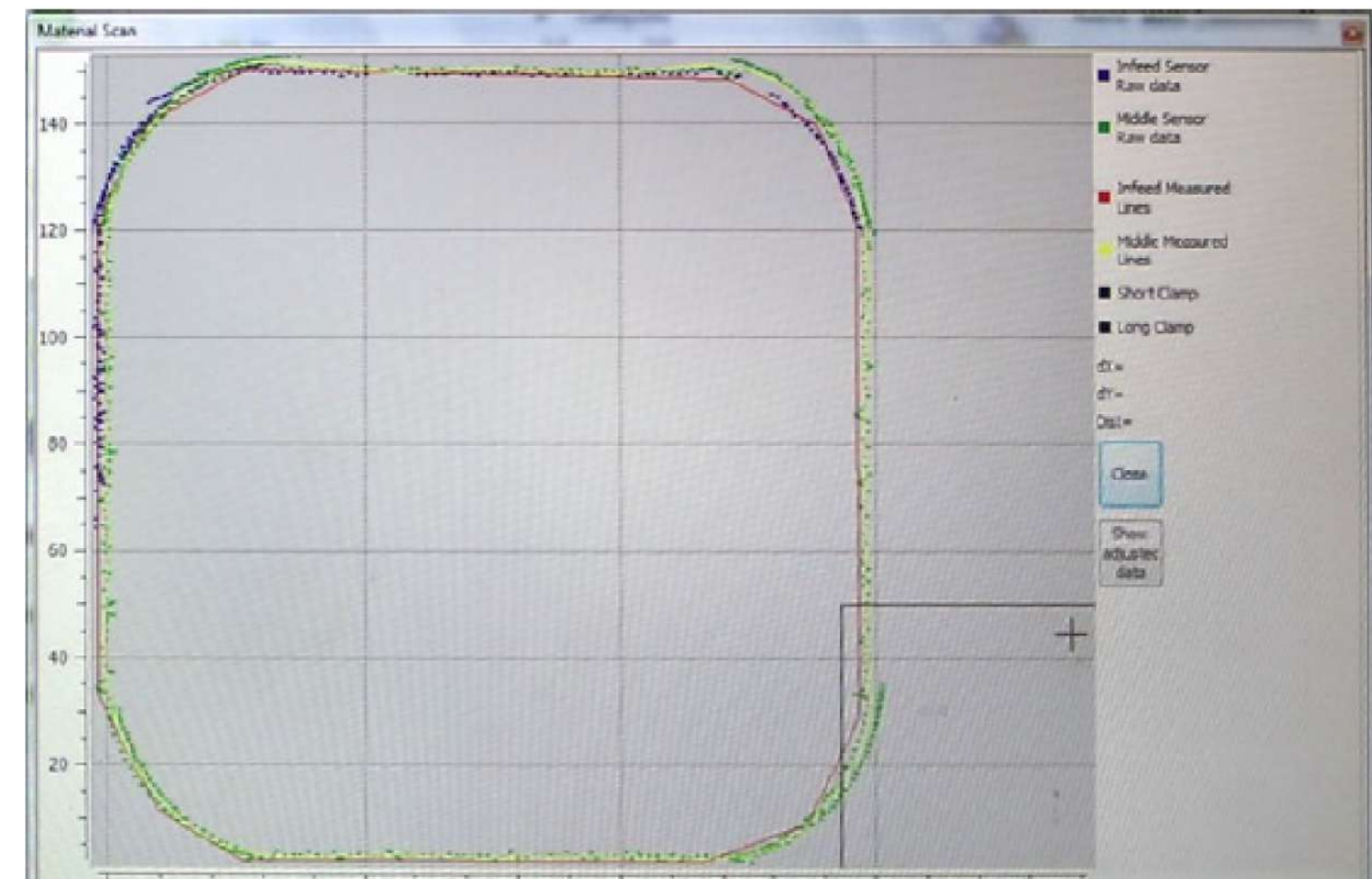
The box section is a complex profile to cut. The torch needs to pass four sides and corners to apply an end cut.

Most end cuts need weld preparation which makes the profiling even more complex. Kaltenbach developed technologies for accurate box section cutting and fast throughput on the logistically optimised SUPERIOR KC 1221.

MEASUREMENT SYSTEM

The actual shape of box section sides and corners can differ compared to the theoretical model. The machine starts a laser measurement routine after loading the cutting data to deal with these differences. Positional displacement of the material, torsion and sectional distortions are measured.

The theoretical material position and cutting paths will be recalculated and are visible to the operator on the interface where both the measurement and the theoretical model are visible.



Interface with a comparison of a scan and the theoretical model



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BOX SECTION CUTTING

INTERLINKED CUTTING

Cuts that cover multiple sides of the box section will be interlinked automatically. Long linked cutting sequences speed up the machine throughput due to a high burner-on time.

EASY FITTING AND WELDING

Box section end cuts are often applied and very difficult to cut by hand. The saddle shaped end cut can only be made by 3D profiling and guarantees easy fitting and welding with a minimum amount of welding volume.

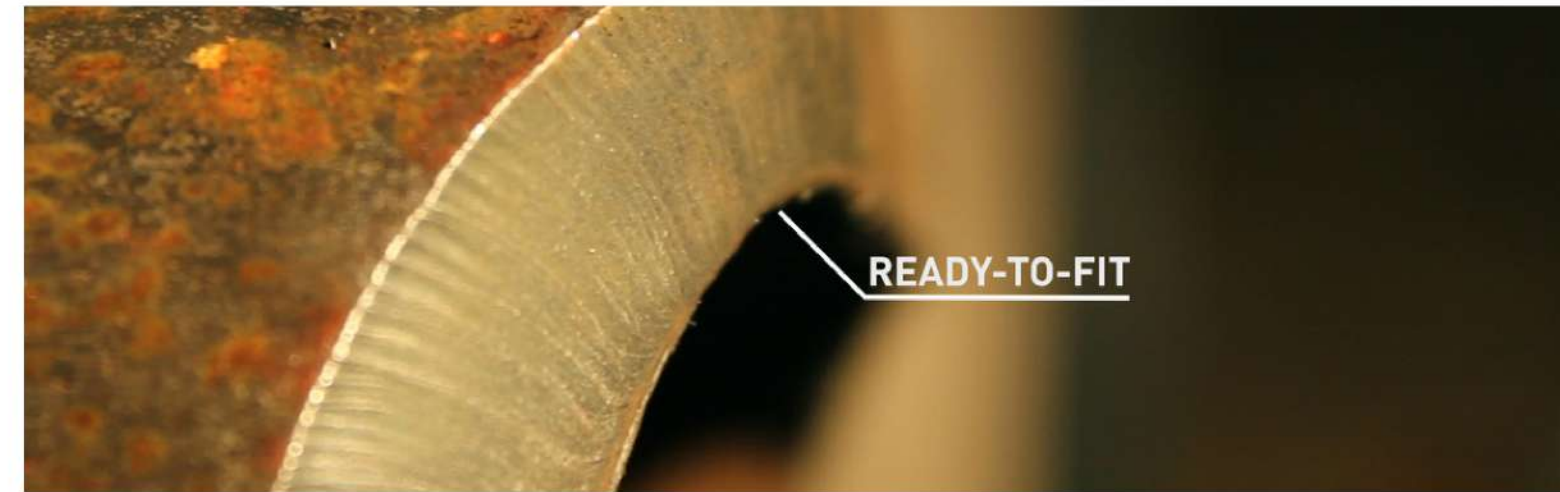




PLATE CUTTING (OPTIONAL)

This contains technical specifications and values for plate cutting on the SUPERIOR KC 1221. Plate cutting is an optional feature to support plate cutting with additional material and software.

PLATE CUTTING

- Plates are grounded through the cutting bed.
- Automatic infeed/outfeed on Kaltenbach sideways loading chains.
- Constant measurement with arc voltage control.
- No mechanical adjustments required.
- Marking is possible.
- Bevel cutting is not supported.
- Standard cutting accuracy applies.

CUTTING BED

- The cutting bed has hoist rings.
- Hoisting will extend supporting legs to stack beds.
- The support ribs are consumable and can be recreated with plate cutting.
- The longitudinal distance is measured with the distance laser.
- The cutting bed contains smoke channels to the rear of the cutting cell.
- The cutting bed is closed at the bottom.
- Multiple plates on one bed is possible.
- Stacking plates on one bed is not allowed.

PLATE CUTTING CAPACITY

Minimum plate width for cutting	300 MM
Maximum plate width for cutting	1220 MM
Maximum plate length	3000 MM
Minimum plate thickness	8 MM
Maximum plate thickness	40 MM
Effective cutting zone (parts longer than 1500 mm cannot be cut according to specified accuracy)	1200 x 1500 MM
Weight of cutting bed	880 KG
Maximum supported weight on cutting bed	1200 KG



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PLATE CUTTING (OPTIONAL)

In addition to 3D profiles, plates are often used in heavy steel industries as supporting brackets or beam stiffeners. To support plate cutting on a beam profiling machine and save costs on a plate cutter, the SUPERIOR KC 1221 has a plate cutting bed that can be used to cut plates.

PLATE CUTTING WITH THE SUPERIOR KC 1221

Factories where floor space is precious or low quantities of plates are processed can greatly benefit from plate cutting with the SUPERIOR KC 1221. It requires the placement of a cutting bed on the conveyor for each cycle, after which the machine can cut a full plate by itself.

By utilising the SUPERIOR KC 1221 conveyors and a separate cutting bed, plate cutting is done inside the cutting cell, utilising all the benefits (e.g., fume extraction, closed compartment cutting, sound reduction, laser measurement) of the SUPERIOR KC 1221 and having one machine to cut plates, beams and bars.



Plate cutting as seen from within the cell



PLATE CUTTING (OPTIONAL)

THE CUTTING BED

A separate cutting bed is loaded from its hoist rings onto the sideways loading chains or the infeed conveyor and can be transported over compatible conveyors (see technical data for compatible conveyors). The cutting bed supports the plate, has consumable ribs that can be cut with plate cutting (rib drawings are included), a closed bottom side with smoke channels to the rear of the cell and makes use of the distance laser measurement of the SUPERIOR KC 1221 to determine position.

SOFTWARE

Cutting files for plate cutting are drawn using CAD/CAM software with .DXF export functionality. There are no macro's for plate cutting on the SUPERIOR KC 1221. External software can be used to nest multiple shapes into a single file. The .DXF format is imported into Kaltenbach's ProCAM to create a cutting file. The generated cutting file does not have separately selectable contours.



Plate cutting with cutting preview on the remote control

CUTTING

The plate is grounded through the cutting bed and the conveyor. All closed contour shapes can be cut, including holes and slots. Parts are automatically cut with the good side of plasma and have kerf correction to deliver high quality cut time and time again. Arc voltage control is used for optimal plasma distance. Bevel cutting functionality is not possible.

ADVANTAGES

- Cut plates with the same machine that cuts beams and bars and save space in your factory
- High quality cuts with arc voltage control and torch measurement laser
- Automatic cutting cycle



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PIPE CUTTING (OPTIONAL)

Profiling shapes are created by software based tools to calculate cutting paths to profile a saddle connection for example. By entering parameters the predefined profiling shape will create a virtual cutting path which can be cut by Kaltenbach's cutting equipment. This section will explain which features the profiling shapes have and something about their application.

All profiling shapes have their own specific features depending on intersection, loads, weld requirements, cutting machine and application specific characteristics. Kaltenbach's profiling shapes are based on AWS, API and ASME standards.





PIPE CUTTING (OPTIONAL)

SADDLE

Intersection geometry

- Adjustable slope.
- Adjustable eccentricity.
- Multiple saddle features with option to switch off the running through in case of one colliding pipe.

Weld preparation

- None, only straight

Cutting

- Standard

HOLE SET-ON

Intersection geometry

- Adjustable slope.
- Adjustable eccentricity.

Weld preparation

- None, only straight

Cutting

- Standard



PIPE CUTTING (OPTIONAL)

CHAMFER

Intersection geometry

- Adjustable slope.
- Multiple chamfer features.

Weld preparation

- None, only straight

Cutting

- Standard

OBLONG HOLE

Intersection geometry

- Adjustable eccentricity.
- Adjustable width (W) and length (L) of hole.

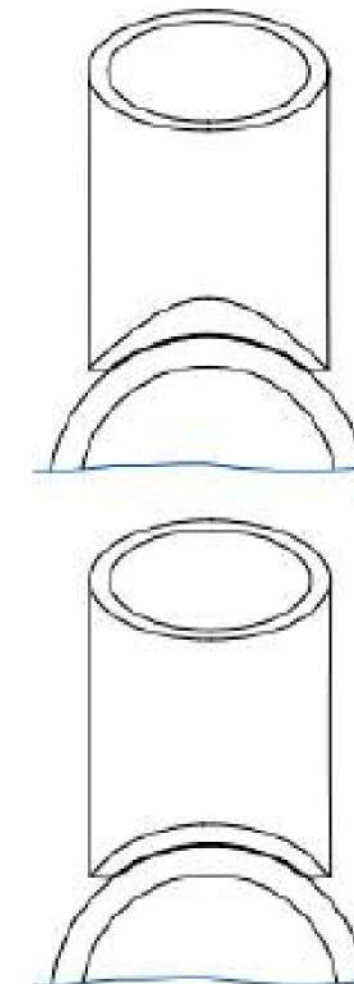
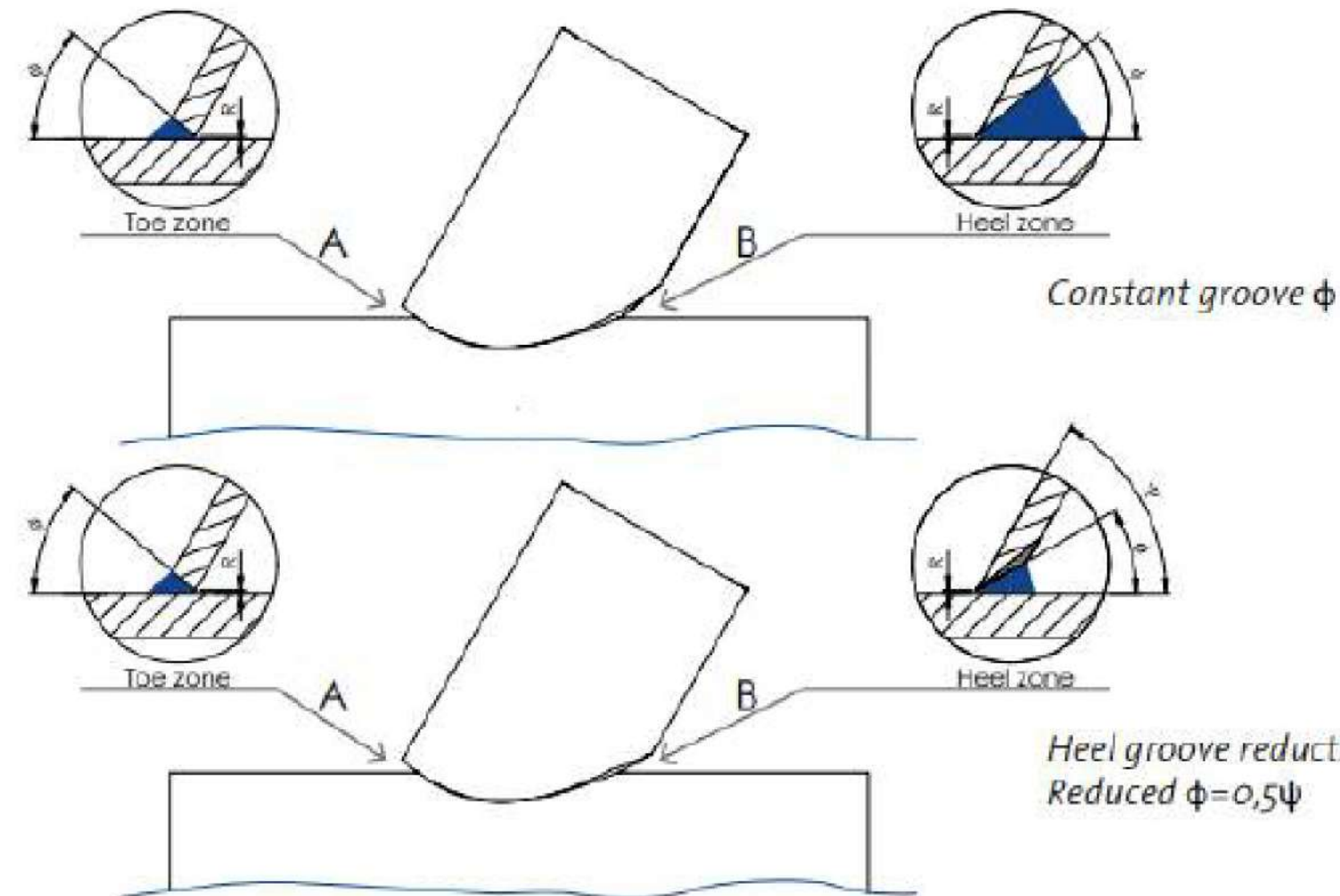
Weld preparation

- None, only straight

Cutting

- Standard

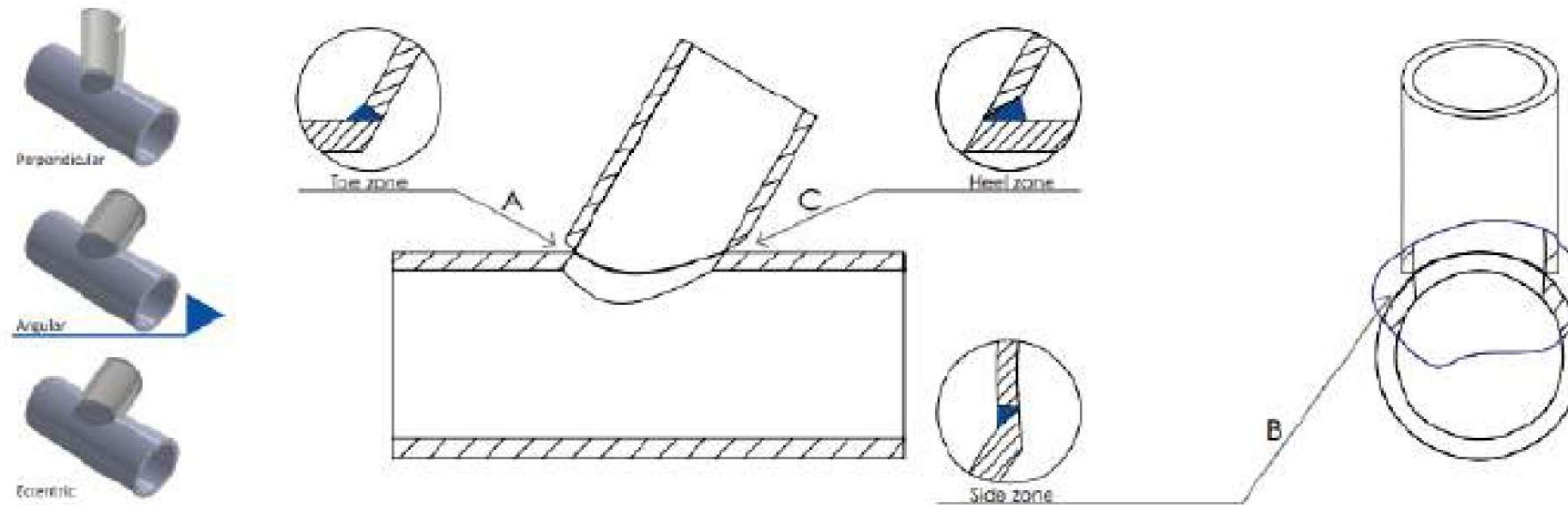
PIPE CUTTING (OPTIONAL)



Saddle - a pipe to pipe connection in tubular structures



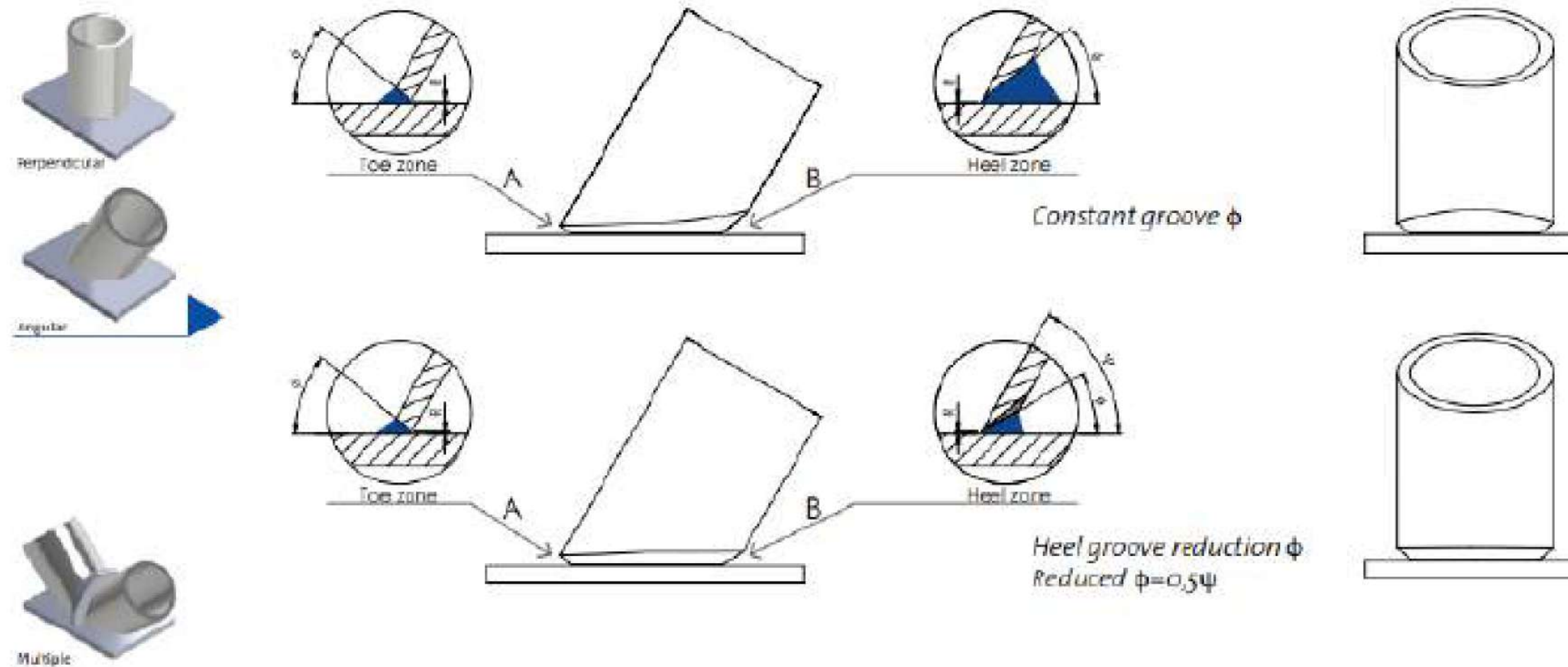
PIPE CUTTING (OPTIONAL)



Hole set-on - To fit a saddle on a hole for example. Saddle is shown to view an application.



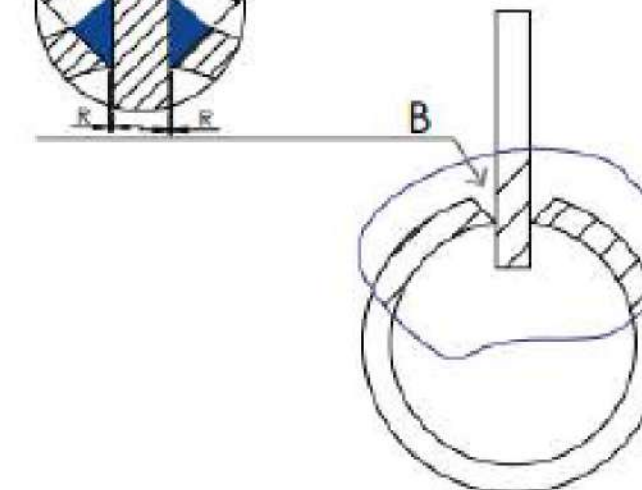
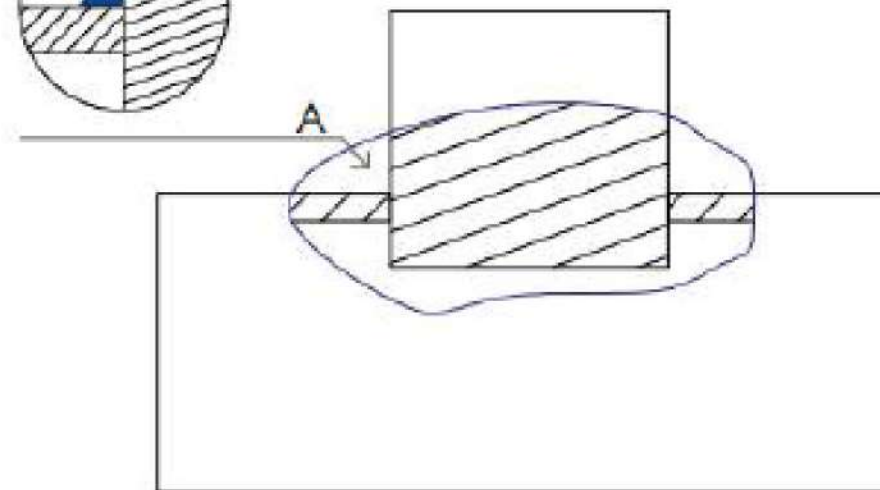
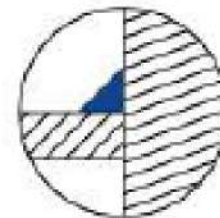
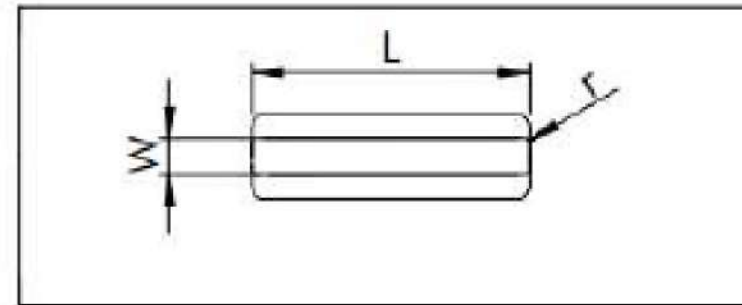
PIPE CUTTING (OPTIONAL)



Chamfer - A pipe to plate connection.



PIPE CUTTING (OPTIONAL)



Oblong Hole - To fit inserted plates at pipe ends or to create intermediate oblong holes.

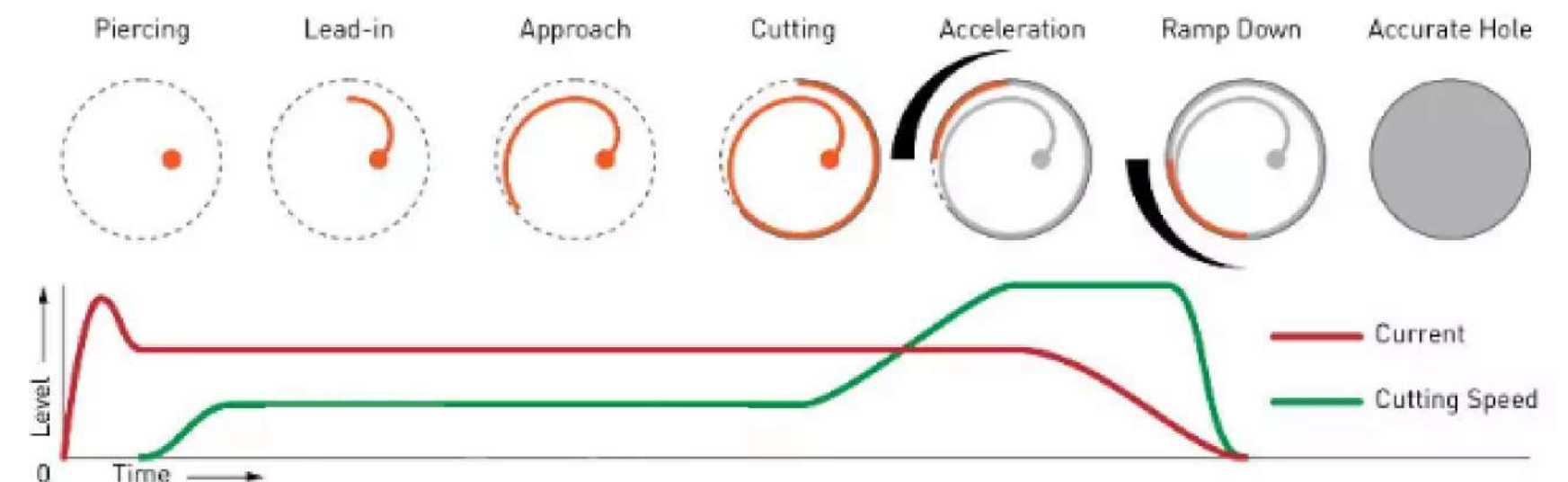
APPENDIX 1

PERFECTHOLE TECHNOLOGY

Cutting of a perfect bolt hole starts with a circular path. This real-time control of all required robot axes ensures a fluent circular path of the cutting torch. A combination of cutting techniques is selected to cut holes perpendicular.

Kerf width compensation, arc shape compensation, optimized cutting direction and a special lead-in and lead-out are the base of this technology. PerfectHole™ Technology leads to a perpendicular, circular and gouge-free hole according to EN 1090-2 and AISC standards.

PerfectHole™ Technology, as shown, compensates for the arc shape behaviour during cutting. The applied lead-out technique prevents increasing the arc length after the scrap piece dropped out which enables a non-gouging arc ramp down for a long consumable lifetime and a gouge-free bolt hole.





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APPENDIX 2

PROFILER TECHNICAL SPECIFICATIONS SET

Profiling shapes are created by software-based tools to calculate cutting paths to profile a saddle connection for example. By entering parameters the predefined profiling shape will create a virtual cutting path which can be cut by Superior KC 1221's cutting equipment.

This section will explain which features the profiling shapes have and something about their application. All profiling shapes have their own specific features depending on intersection, loads, weld requirements, cutting machine and application-specific characteristics.

Superior KC 1221's profiling shapes are based on AWS, API and ASME standards.




APPENDIX 2

PROFILER TECHNICAL SPECIFICATIONS SET
MATERIALS SUPPORTED FOR PROFILING

These profile types and sizes can be cut by the SUPERIOR KC 1221 based on the effective robot cutting zone. Comparable sizes of other standards are also supported.



	SECTION RANGE		ACCEPTABLE TOLERANCES
	MINIMUM	MAXIMUM	ACCORDING TO STANDARD
Theoretical metric beam dimensions (mm)	100 x 50	1220 x 430	EN 10034: 1993
IPE Parallel flange I sections	IPE 100	IPE 750	EN 10034: 1993
IPN Taper flange I sections	IPN 100	IPN 600	EN 10024: 1995
HE Wide flange beams (AA/A/B/M)	HE 100	HE 1000	EN 10034: 1993

APPENDIX 2

PROFILER TECHNICAL SPECIFICATIONS SET MATERIALS SUPPORTED FOR PROFILING



	SECTION RANGE		ACCEPTABLE TOLERANCES
	MINIMUM	MAXIMUM	ACCORDING TO STANDARD
HL Extra wide flange beams(1)	HL 920	HL 1100	EN 10034: 1993
HD Wide flange columns	HD 260	HD 400	EN 10034: 1993
HP Wide flange bearing piles	HP 200	HP 400	EN 10034: 1993
W Wide flange beams	W 4	W 44	ASTM A 6/A 6M - 12


1. Beam weight may not exceed the maximum supported material weight per meter.

APPENDIX 2

PROFILER TECHNICAL SPECIFICATIONS SET

MATERIALS SUPPORTED FOR PROFILING




	SECTION RANGE		ACCEPTABLE TOLERANCES
	MINIMUM	MAXIMUM	ACCORDING TO STANDARD
S Standard beams	S 4	S 24	ASTM A 6/A 6M - 12
HP Wide flange bearing piles	HP 8	HP 14	ASTM A 6/A 6M - 12

APPENDIX 2

PROFILER TECHNICAL SPECIFICATIONS SET

MATERIALS SUPPORTED FOR PROFILING





	SECTION RANGE		ACCEPTABLE TOLERANCES
	MINIMUM	MAXIMUM	ACCORDING TO STANDARD
Theoretical metric channel dimensions (mm)	100 x 50	475 x 150	EN 10279: 2000
UPE Parallel flange channels	UPE 100	UPE 400	EN 10279: 2000
UNP European standard channels	UNP 100	UNP 400	EN 10279: 2000
C Standard channels	C 4	C 15	ASTM A 6/A 6M - 12
MC Channels	MC 6	MC 18	ASTM A 6/A 6M - 12

APPENDIX 2

PROFILER TECHNICAL SPECIFICATIONS SET

MATERIALS SUPPORTED FOR PROFILING



	SECTION RANGE		ACCEPTABLE TOLERANCES
	MINIMUM	MAXIMUM	ACCORDING TO STANDARD
<div>  </div> <div>Angle bar equal metric (mm)</div>	L 75	L 300	EN 10056-2: 1993
<div>  </div> <div>Angle bar unequal metric (mm)</div>	L 100 x 50	L 200 x 100	EN 10056-2: 1993




APPENDIX 2

PROFILER TECHNICAL SPECIFICATIONS SET

MATERIALS SUPPORTED FOR PROFILING



	SECTION RANGE		ACCEPTABLE TOLERANCES
	MINIMUM	MAXIMUM	ACCORDING TO STANDARD
Box section, RHS, SHS (2)	100 x 100 x 8	600 x 400	EN 10056-2: 1993

2. A floor pit underneath the cutting cell is recommended for easy scrap removal.




APPENDIX 2

PROFILER TECHNICAL SPECIFICATIONS SET

MATERIALS SUPPORTED FOR PROFILING



	SECTION RANGE		ACCEPTABLE TOLERANCES
	MINIMUM	MAXIMUM	ACCORDING TO STANDARD
Narrow flat bar	100 x 15(3)	150 x 40(4)	EN 10058: 2003
Flat bar	160 x 15(3)	400 x 40(4)	EN 10058: 2003
Bulb	100 x 6(3)	430 x 20	EN 10067: 1997
T-bar	T 100 x 50	T 140	EN 10055: 1996

3. Minimum profiles should be loaded directly onto the roller conveyors, not the chains (if present).
4. Maximum wall thickness for profiling depends on plasma unit specifications.

OPTIONAL



APPENDIX 3

MARKING AND ACCURACY

MARKING

- Plasma marking is available as an integrated feature on the torch. Marking requires additional gas connections.
- Marking is supported with DSTV Tekla import or manual data input in ProCAM.

CUTTING ACCURACY

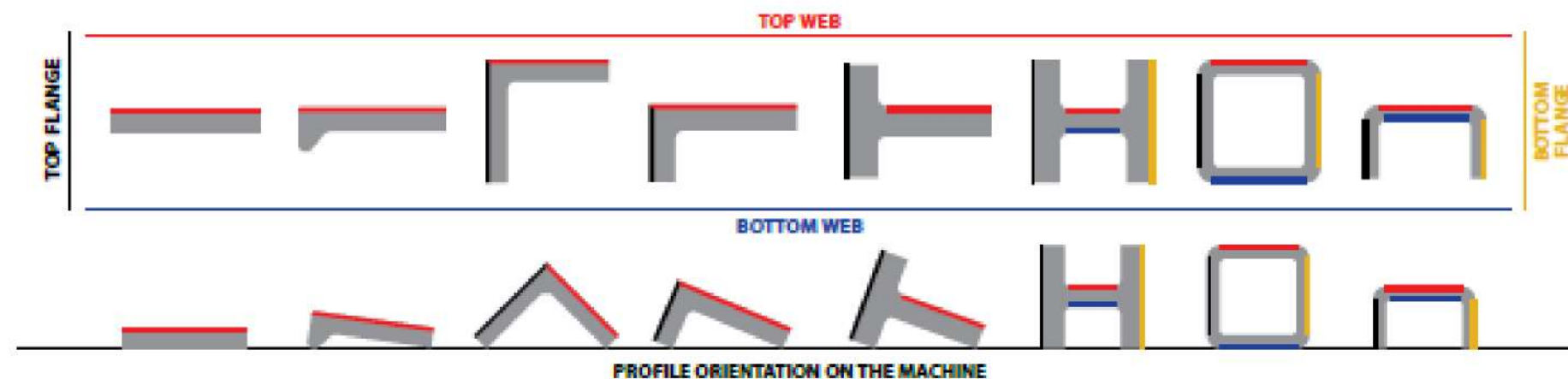
- All accuracy data is according to ISO 9013; bevel deviation $\pm 2^\circ$.
- Cut values based on clean mild steel material without deviations.
- Sufficient training by Kaltenbach is required to obtain the mentioned accuracies.
- Cutting paths with sharp corners may influence tolerances.
- Cutting accuracy is not related to the torch positioning accuracy.

DOUBLE BEVELLING

- Constraints of thermal cutting process wall thickness (t)
- Double bevel: $t \geq 15$ mm
- Single bevel with nose: $t \geq 15$ mm
- Double bevel with nose: $t \geq 20$ mm
- Nose: height ≥ 5 mm (smaller sizes possible but results are inaccurate).

PLASMA MARKING

SUPPORTED MARKING SURFACES					
PROFILE	SHAPE	TOP FLANGE	TOP WEB	BOTTOM WEB	BOTTOM FLANGE
FLAT BAR		N/A	YES	NO	N/A
BULB/HP		N/A	YES	NO	N/A
ANGLE (EQUAL)		YES	YES	NO	N/A
ANGLE (UNEQUAL)		YES	YES	NO	N/A
T-BAR		YES	YES	NO	N/A
H-BEAM		YES	YES	YES	YES
SHS		YES	YES	YES	YES
CHANNEL		YES	YES	YES	YES





APPENDIX 3

MARKING AND ACCURACY

MARKING

- Plasma marking is available as an integrated feature on the torch. Marking requires additional gas connections.
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- Double bevel with nose: $t \geq 20$ mm
- Nose: height ≥ 5 mm (smaller sizes possible but results are inaccurate).

PLASMA CUTTING ACCURACY

CUTTING LENGTH	TILT ANGLE IN DEGREES	
	0°	45°
5 - 15 MM	0.5 MM	1.0 MM
15 - 30 MM	0.8 MM	1.5 MM
30 - 50 MM	1.5 MM	2.5 MM
50 - 75 MM	2.0 MM	-

Note: Maximum cutting length depends on type of plasma source.



APPENDIX 4

MAIN CONNECTIONS

These pages contains all connection specifications and values for the machine gas and power consumption. The connected load will differ depending on the offered machine configuration.

POWER SUPPLY

- Power supply: 3 phase/PE
- Mains AC voltage +10% -5%
- Mains frequency ± 1 Hz
- Recommended fuses are based on 400 V
- The given pressure, flow rates and power consumption of the plasma supplies are maximum values

REMARKS FOR INSTALLATION

- Overlength of cables and hoses must be 5 meters from the rear of the foundation as shown on the layout drawing.
- Floor must be horizontal ± 10 mm.
- Separated earth pin required $R_{max} = 0.5\Omega$.

MACHINE CONSUMPTION

	POWER	GAS
Control unit	18 kVA fuse 3 x 32 A slow	Air 7 bar & 8000 Ndm ³ /h
Stäubli TX90 Robot	4 kVA fuse 3 x 8 A slow	-
DFPro 6 dust collector	7.5 kVA fuse 3 x 25 A slow	Air 7 bar & 16200 Ndm ³ /h(1)

1. Approximate compressed air consumption: ± 45 N-litres per pulse (± 16.2 Nm³/h for a 10 second pulse interval at 7 bar). Note: the DFPro is a particle filter, not a gas filter. The air flow will remove smoke and fumes from the cell and filter out particles but it is strongly recommended that the exhaust from the DFPro is released to the exterior. The removal of fumes during the cutting of box sections in particular is limited, a secondary fume exhaust system or personal safety measures may be required.



APPENDIX 4 MAIN CONNECTIONS

PLASMA CUTTING

2. High pressure requirements. Pressure booster might be needed
 3. Automatically switches between cutting and marking
 4. Oxygen filtered 40/0.01 µm plasma
 5. Requirements to air quality according to ISO 8573: maximum size of particles is 0.1 µm (cat. 1), maximum oil content is 0.01 mg/m³ (cat. 1), maximum pressure dew point is +3°C (cat. 4)
 6. Argon or nitrogen is only required if the marking option is included
- Source: Kjellberg Finsterwalde Instruction Manuals 2013 - 2015

SOURCE	GAS CONSOLE	POWER	CONNECTABLE GASES	GAS TYPE	CONNECTION
HF 280i(2)	PGE-440 Manual Multi-Gas Console(3)	67 kVA	Oxygen(4) (99.5%) 9 bar & 3500 Ndm ³ /h Air(5) 9 bar & 6400 Ndm ³ /h Argon(6) (99.996%) 9 bar & 3400 Ndm ³ /h	Plasma/swirl Swirl Plasma (marking)	G 1/4" G 1/4" G 1/4"
HF 440i(2)	PGE-440 Manual Multi-Gas Console(3)	127 kVA	Oxygen(4) (99.5%) 9 bar & 3500 Ndm ³ /h Air(5) 9 bar & 6400 Ndm ³ /h Argon(6) (99.996%) 9 bar & 3400 Ndm ³ /h	Plasma/swirl Swirl Plasma (marking)	G 1/4" G 1/4" G 1/4"
XPR 170	VWI	40.5 kVA fuse 3x80A slow	Air(1) 9 bar & 7080 Ln/h Oxygen(2) (99.5%) 9 bar & 4260 Ln/h Nitrogen (99.9%) 9 bar & 10860 Ln/h Argon (99.996%) 9 bar & 7080 Ln/h F5 (5% H, 95% N) 9 bar & 2400 Ln/h	Swirl Plasma/swirl Plasma/swirl Plasma (marking) Plasma	G 9/16" G 9/16" G 5/8" G 5/8" G 9/16"
XPR 300	VWI	71.5 kVA fuse 3x 150A slow	Air(1) 8 bar & 11330 Ln/h Oxygen(2) (99.5%) 8 bar & 4250 Ln/h Nitrogen (99.9%) 8 bar & 11610 Ln/h Argon (99.996%) 9 bar & 7080 Ln/h F5 (5% H, 95% N) 9 bar & 2400 Ln/h	Swirl Plasma/swirl Plasma/swirl Plasma/swirl Plasma/swirl	G 9/16" G 9/16" G 5/8" G 5/8" G 9/16"



APPENDIX 5

PRODUCTIVITY CALCULATIONS

What is your greatest worry in a fabrication process?

Is it the complexity of the design, poor production flow management, inefficient material handling with too much material waste?

The Superior KC 1221 is the most advanced and productive one on the market today, setting new standards by offering an entire fabrication shop in a single machine.

PROCEDURE	BEFORE	NOW	TIME SAVED
1 cut 800mm	hand cutting	CNC cutting	88,9% fast material measurements high-speed throughput practically eliminate grinding
marking	164 sec	0 sec	
moving	180 sec	120 sec	
cutting	1,880 sec	180 sec	
moving	180 sec	0 sec	
grinding	508 sec	20 sec	
total in seconds total in minutes	2,912 sec 48.53 min	320 sec 5.33 min	



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APPENDIX 6

CASE STUDIES

HOW AUTOMATION DOUBLED ACA'S CAPACITY

That's why we decided to invest in a Superior 3D Profile Plasma Cutting and Coping Robot from Specialist Machinery Sales. This replaces 6 machines including the drill, band saw, angle and flat bar machine, plate plasma, layout and stamp marking. So I can push more tonnage through the machine and the footprint available. MOHAMED ELOMAR, General Manager

ACA has doubled the capacity of their workshop. "Prior to the installation of the machine supplied by SMS, we produced 50 tonnes per week. Now we can produce 100 tonnes per week—all without increasing either our workforce or our footprint." This increased capacity means that ACA can meet clients' project timeframes much more easily, and is even able to sell their excess capacity to some of the local steel service centres.

LEARN MORE HERE ►





**SPECIALIST
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AUSTRALIA, NEW ZEALAND & SE ASIA

APPENDIX 6

CASE STUDIES

PRODUCTION CAPACITY BROUGHT TO THE NEXT LEVEL WITH FOUR SUPERIOR MACHINES FROM SMS

With implementation of the SMS machines, we were able to cope with the plasma which is significantly faster and way more productive.

DAVID POWER, Facility Manager

CIVMEC is very on-point when it comes to innovation to improve the company's productivity and efficiency. That is why they have chosen to invest in SMS's machinery. "Originally a part of the reason why we bought the Superior 3D Profile Plasma Cutting and Coping Robot was that we wanted to be able to bevel box sections, which we weren't able to do previously".

LEARN MORE HERE ►





APPENDIX 7

REFERENCE LIST

COUNTRY	PROJECT	SEGMENT	YEAR OF SUPPLY
IRELAND	Steel Solutions (NI) Ltd	Steel Construction	2017
UNITED STATES	Rodgers Metal Craft Inc.	Steel Construction	2018
UNITED STATES	T&M Manufacturing, Inc.	Steel Construction	2018
UNITED STATES	Kansas City Structural Steel	Steel Construction	2018
UNITED STATES	Black Lion Products	Steel Construction	2018
UNITED STATES	Glazier Steel	Steel Construction	2018
UNITED STATES	Central Texas Iron Works	Steel Construction	2018



APPENDIX 7

REFERENCE LIST

COUNTRY	PROJECT	SEGMENT	YEAR OF SUPPLY
CHINA	Fangyuan Group CO., Ltd.	Steel Construction	2018
UNITED STATES	Fehr's Metal Building Construction LLC	Steel Construction	2018
AUSTRALIA	Southern Queensland Steel	Steel Construction	2018
AUSTRALIA	BRICE	Steel Construction	2018
NORWAY	Aibel AS	Offshore	2018
SPAIN	Hierros Diego, S.L.	Steel Construction	2018
BELGIUM	Willems N.V.	Offshore	2018



APPENDIX 7

REFERENCE LIST

COUNTRY	PROJECT	SEGMENT	YEAR OF SUPPLY
SAUDI ARABIA	Factory of Arabian International Company for Steel Structure	Steel Construction	2018
NORWAY	Kvaerner Stord AS	Offshore	2018
AUSTRALIA	Apollo Fabrication Group Pty Limited	Steel Construction	2018
NEW ZEALAND	Laser Stream Cutting 2017 Limited	Steel Construction	2018
SPAIN	Perfiles Aragon S.A.	Steel Construction	2018
UNITED STATES	Central Texas Iron Works	Steel Construction	2019



APPENDIX 7

REFERENCE LIST

COUNTRY	PROJECT	SEGMENT	YEAR OF SUPPLY
UNITED STATES	PKM Steel Service, Inc.	Steel Construction	2019
CANADA	IPAC Services Corp.	Steel Construction	2019
ROMANIA	MTD Simplu Construct SRL	Steel Construction	2019
UNITED STATES	Glenco Inc.	Steel Construction	2019
SAUDI ARABIA	Saad Alessa Metal Industries Factory	Steel Construction	2019
UNITED ARAB EMIRATES	Drydocks World - Dubai LLC	Offshore	2019



APPENDIX 7

REFERENCE LIST

COUNTRY	PROJECT	SEGMENT	YEAR OF SUPPLY
NORWAY	AS NYMO	Offshore	2019
GERMANY	Temme Stahl- und Industriebau GmbH	Steel Construction	2019
BULGARIA	Metalni Konstruktsii-Pleven EAD	Steel Construction	2020
UNITED STATES	LabelleCo Fabrication	Steel Construction	2020
INDONESIA	PT Profab Indonesia	Offshore	2020
MEXICO	Tensa Construcciones, SAPI de CV	Steel Construction	2020



APPENDIX 7

REFERENCE LIST

COUNTRY	PROJECT	SEGMENT	YEAR OF SUPPLY
UNITED STATES	Gunderson LLC	Shipbuilding	2020
UNITED STATES	Smith Ironworks, Inc.	Steel Construction	2020
ANGOLA	Algoa Cabinda Fabrication Services Lda	Offshore	2020
UNITED STATES	LeJeune Steel Company	Steel Construction	2020
UNITED STATES	New Orleans Iron Works Inc	Steel Construction	2020
UNITED STATES	Capone Iron Corporation	Steel Construction	2020



APPENDIX 7

REFERENCE LIST

COUNTRY	PROJECT	SEGMENT	YEAR OF SUPPLY
UNITED STATES	Therma-Tron-X	Steel Construction	2020
GERMANY	Haslinger GmbH	Steel Construction	2020
AUSTRALIA	Amplified Contractors Pty Ltd	Steel Construction	2020
AUSTRALIA	Walpett Engineering Pty. Ltd.	Steel Construction	2020
AUSTRALIA	Walpett Engineering Pty. Ltd.	Steel Construction	2020
NETHERLANDS	Rometal	Contracting	2021
UNITED STATES	Cherokee Steel	Steel Construction	2021



APPENDIX 7

REFERENCE LIST

COUNTRY	PROJECT	SEGMENT	YEAR OF SUPPLY
THAILAND	Deeline Construction Co. Ltd	Offshore	2021
UNITED STATES	Structural Steel	Steel Construction	2021
NORWAY	Rosenberg	Offshore	2021
UNITED STATES	Kiewit Offshore Services - Corpus Christi	Offshore	2021
SOUTH KOREA	VNI	Contracting	2021
FINLAND	NPP	Steel Construction	2021
PORTUGAL	Alenmot	Steel Construction	2021



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APPENDIX 8

SUPERIOR SERVICE

OPTIMAL AVAILABILITY AND PERFORMANCE

With 135 years in business, we are the experts in steel processing and surface treatment. Our custom made service solutions guarantee that you benefit from an optimal performance, availability and continuous high quality output of your investment.

EXCELLENT PREVENTIVE MAINTENANCE PACKAGES

Maximum uptime can be ensured thanks to our excellent preventive maintenance packages. Together with you, our skilled engineers will keep your equipment up to date, improve your process efficiency and give advice to meet new market demands.

ADVANCED PROCESS MONITORING SYSTEMS

With the help of advanced process monitoring systems, you will get a clear insight in your machine performance, and preventive maintenance can be planned in time.

PROFESSIONAL HELPDESK

For fast and immediate assistance, you can rely on our help desk. Spare parts and assistance will be quickly on site, whenever and wherever needed.





**SPECIALIST
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APPENDIX 8

SUPERIOR SERVICE

ORIGINAL SPARE PARTS AND STARTER KITS

Original spare parts stand for optimum efficiency, higher uptime and a longer service life of your machine. In order to safeguard production continuity and short down time, you can make use of various starter kits. In that case you will have all parts you need on stock.

FIRST-CLASS ASSISTANCE ON SITE

Knowledge, experience and a passionate commitment to support our customers in the best possible way is what makes our service strong. Together, we will look for the best manufacturing methods for your products.

EFFECTIVE TRAINING

Tailor-made training programs will improve the productivity of your machine, as well as the skills of your employees.





SUPERIOR PRICE SUMMARY

ALL PRICES IN EURO

SUPERIOR KC 1221	SUPERIOR KC 1221 COPING ROBOT	897.340,--
T14	T14 TRANSPORT SYSTEM, comprising:	
T14-1370-A1	Infeed roller conveyor	37.860,--
T14-1370-A2	Outfeed roller conveyor	28.920,--
T14-1/3	Safety light-grill barrier, 3 pieces	9.600,--
TOTAL	Total price of the system EXW (INCOTERMS 2020), excluding installation and commissioning in EUR	973.720,--



SUPERIOR PRICE SUMMARY

ALL PRICES IN EURO

SUPERIOR KC 1221	SUPERIOR KC 1221 COPING ROBOT	TBD
T14	T14 TRANSPORT SYSTEM, comprising:	
T14-1370-A1	Infeed roller conveyor	TBD
T14-1370-A2	Outfeed roller conveyor	TBD
T14-1/3	Safety light-grill barrier, 3 pieces	TBD
TOTAL	Total price of the system EXW (INCOTERMS 2020), excluding installation and commissioning in EUR	TBD



SUPERIOR PRICE SUMMARY

ALL PRICES IN EURO

Optional Equipment | Coping Robot

KC1221-1	Scrap trolley	TBD
KC1221-2	Dust cleaning system for plasma flame cutting unit	TBD
KC1221-3	Additional price for HiFocus 440i neo with 440A	TBD
KC1221-4	Add-on price for XPR 300 with 300A	TBD
KC1221-5	Further transport table for plates	TBD



SUPERIOR PRICE SUMMARY

ALL PRICES IN EURO

Optional Equipment | Software

KC1221-6	CAD Interface Inventor	TBD
KC1221-7	CAD Interface SolidWorks	TBD
KC1221-8	Cutting Intelligence for Bulb Profiles	TBD
KC1221-9	Cutting Intelligence for Flat Profiles	TBD
KC1221-10	Cutting Intelligence for Square Tubes	TBD
KC1221-11	Cutting Intelligence for plates incl. transport table	TBD



SUPERIOR PRICE SUMMARY

ALL PRICES IN EURO

Optional Equipment | Length Measuring System

KC1221-15	Extension of the measuring length by further 18 m with a pop-up laser	TBD
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Optional Equipment | T14 Transport System

T14-SK-K1	Infeed cross transport via drag chains for material lengths from 2,2 - 12 m	TBD
T14-HW-K1	Infeed cross transport via lift-and-carry system, (instead of drag chains) for material lengths from 2,2 - 12 m	TBD
T14-QTP-K1	Infeed cross transport via Trailing Hooks, (instead of drag chains) for material lengths from 2,2 - 12 m	TBD
T14-SK-L2	Outfeed cross transport via drag chains for material lengths from 2,2 - 12 m	TBD
T14-HW-L2	Outfeed cross transport via lift-and-carry system, (instead of drag chains) for material lengths from 2,2 - 12 m	TBD



SUPERIOR PRICE SUMMARY

ALL PRICES IN EURO

Optional Equipment | T14 Transport System (continued)

T14-QTP-L2	Outfeed cross transport via Trailing Hooks, (instead of drag chains) for material lengths from 2,2 - 12 m	TBD
	Add-on price, extension of the infeed/outfeed cross transport depth by each 1 m, per drag chain/lift-and-carry stillage	TBD
T14-5	Silencer, per piece	TBD
	Additional safety light-grill barrier, per piece	TBD
T14-2	Safety fence, per running meter	TBD



SUPERIOR PRICE SUMMARY

ALL PRICES IN EURO

Optional Equipment | T14 Transport System (continued)

T14-3	Cooling device for the switchboard cabinet	TBD
T14-4	Heating device for the switchboard cabinet	TBD

Optional Training Sessions

KC1221-12	Additional on-site training	TBD
KC1221-13	Pre-operator training in Experience Center	TBD
KC1221-14	Pre-work-preparation training in Experience Center	TBD



TERMS AND CONDITIONS

Our scope of supply is exclusively based on the various documents constituting our offer and shall rank in the following order of precedence:

The following documents / conditions apply in the order given:

- This offer and this general terms of our offer and the operating manual
- General terms and conditions of our offer
- Orgalime S2000

Other purchase, delivery or contract conditions are only applicable if they have been confirmed in writing by us.

MACHINE ENGINEERING EQUIPMENT

- Technical alterations in respect of further developments concerning construction and manufacturing technology are reserved.
- PAINT

Basic colour:

Anthracite grey – RAL 7016 machine body, length measuring carriage, transport facility, safety fences

Others:

1. Turquoise blue – RAL 5018 machine parts
2. Light grey – RAL 7035 operating and control cabinets
3. Dust grey – RAL 7037 dust clearing systems

- Permissible ambient temperature of the line: +5 up to +35°C, max. 95% relative humidity.
- Initial filling with hydraulic oil and gear oil.

MACHINE ENGINEERING EQUIPMENT (CONTINUED)

- Electrical Equipment according to European standard EN 60204-1. Electric connection (TN-network): 3 phases, neutral, earth 400 V, 50 Hz. Besides the machine, the supply also includes the control cabinet, operating desk and all cables within the line. Cable length from machine to switchboard cabinet max. 10 m, longer lengths available upon request, at additional cost.

NOTES

Concerning the operation of the material transport facility: All manually released material movements of the transport line, like e.g. cross and longitudinal transports, are switched on and off via securely locked joysticks from the operating cabinet.

EXCLUDED ITEMS

The price does not include:

- Offloading and provision for crane as well as provision for auxiliary personnel, resources and tools in accordance with our assembly conditions.
- The installation and during the assembly required miscellaneous materials and equipment like tools, consumable and cutting material for the commissioning as well as lifting devices.
- Foundation work (which has to be made in accordance with our drawing), anchor bolts.
- Grouting of foundations after alignment.
- Channel covers from machine foundation to operating desk.
- Provision of services (electric, compressed-air) to the machine or operating cabinet.
- Office PC with operating system and network card.
- Connection cable and installation for data transfer from the office PC to the machine PC.
- Cooling units for operating desk and control cabinet.
- Voltage stabilizer.
- Protective installations in the area of the partly automatically working material transport facility and length measuring unit, for example: fences, protective grates, roofing, etc. These are required to provide a CE-declaration of conformity.

REGULATIONS FOR THE PREVENTION OF ACCIDENTS

The machine/line will be delivered with the required safety light grill barriers. After installation and commissioning of that equipment as well as after installation of the safety fences to be provided by the customer, we will provide you with a CE declaration of conformity and a CE-decal.

REGULATIONS FOR THE PREVENTION OF ACCIDENTS (CONTINUED)

The CE-conformity is condition for operating of the machine/line within the EC. The starting-up of the machine/line is prohibited until the conformity is provided according to the actual appropriate regulations and norms.

In case of extension or major changes of the delivered machine/line, the user or another person put in charge by the user is responsible for issuing the new CE-declaration of conformity and provision with a CE-decal.

TECHNICAL DOCUMENTATION

The attached layout drawing forms part of this offer. In case of order, please let us have your approval of this layout within one week. If the layout was not approved within two week from date of order placement, we reserve the right to fix a new date of delivery.

All machines without a PC receive the operating instructions on a data carrier. A paper copy of the operating manual is optional available at a price of 150 EUR. For machines with a PC, the scope of delivery also includes a PDF-file on a data carrier. A translation of the national language will be invoiced unless a CE declaration of conformity is required.

DELIVERY PERIOD

To be agreed.

The delivery lead time starts from receipt by Kaltenbach of the signed acceptance section from the order confirmation document and also the final clarification of all order details, technical information, layout drawing approval and the receipt of the agreed payment or payment security. The delivery period is subject to correct and punctual delivery to ourselves.

In the event of delays to shipment or delivery date caused by the buyer, Kaltenbach reserves the right to declare goods and/or machinery ready for shipment and to invoice accordingly. With this declaration of readiness to ship, the risk and responsibility for such goods and/or machinery transfers to the buyer.

In case we can't deliver due to reasons for which Kaltenbach is not responsible, Kaltenbach reserves the right to charge costs for default interest of 0.5% of the outstanding amount per week – however maximum 7.5%. Storage costs will be charged with 3.50 € per m² and per week. In case the costs will be higher, these higher costs can be charged additionally.

Should we be late with delivery, the customer shall be entitled to demand compensation for the delay. This compensation shall amount to 0.5 % of net price for each full week of delay, but not more than a total of 5 % of the value of that portion of the goods to be delivered.



TERMS AND CONDITIONS

PRICES

The mentioned prices are to be understood ex works, packaging excluded. This quote is non-binding. Kaltenbach reserves the right to make technical changes.

The prices stated in the offer are subject to the price stability of the material and delivery costs required for production. We reserve the right to pass on any price fluctuations that are charged between the conclusion of the contract and the execution of the order or delivery to us in the same way. This can also lead to an increase in the stated final price.

INSURANCE

Transit insurance coverage of contracted items shall be covered by the buyer.

TAXES AND DUTIES

All taxes, duties, bank commissions and charges (letters of credit, bank guarantees) outside Germany related to this offer have to be shouldered by the buyer. All taxes, duties, bank commissions and charges inside Germany related to this offer will be shouldered by us.

CONSEQUENTIAL LOSSES

Save as elsewhere stated in these conditions there shall be no liability for either party towards the other party for loss of production, loss of profit, loss of use, loss of contracts or for any consequential, economic or indirect loss whatsoever. The seller should not be liable for defects which may cause loss of production, loss of profit and other indirect loss.

DISPUTES AND APPLICABLE LAW

All disputes arising in connection with the offer shall be finally settled under the Rules of Conciliation and Arbitration of the International Chamber of Commerce. The contract shall be governed by the substantive law of the supplier's place of business.

EXPORT REGULATIONS

It is understood that a final order acceptance is always subject to the receipt of an export release from the German Federal Export Agency and the German customs authorities.

WARRANTY PERIOD

12 months parts and labour, calculated from the date of installation or a maximum of 2,000 operating hours (which is achieved first) excluding wear and tear parts, at latest 15 months from delivery date ex works Kaltenbach.

INSTALLATION AND COMMISSIONING

Kaltenbach will send one mechanical service engineer and one electrician for the assembly and commissioning at the job-site. The costs incurred in this context are either included in the total price as an imputed fixed price or are calculated at the cost rates applicable at the time of the service.

It is agreed that the customer will provide the assistance of 2 skilled mechanics for the entire period of setting up and 1 electrician occasionally per line resp. per Kaltenbach service engineer, at no costs for Kaltenbach.

Note: From the start of installation on, the customer has to provide a DSL internet access, power, air and gas connection (for machines with torches).

It is agreed that the acceptance will be carried out in accordance with the Kaltenbach guidelines. This policy, which accompanies the offer / contract, provides for tests on the transportability and workability of the material. After successful completion of the test, the acceptance is deemed to have taken place.

ADDITIONAL COSTS

The parties are aware that in connection with national and international restrictions due to the Covid-19 pandemic, delays and additional costs for the use of personnel in installation and commissioning of the scope of supply may arise. This applies, for example, if it is necessary to send personnel from Kaltenbach to the client, but the place of work is in a risk area.

If the personnel to be deployed by Kaltenbach cannot be deployed immediately, e.g. due to quarantine regulations to be observed, and delays arise as a result, it is mutually agreed that this is not to be assessed as a delay for which Kaltenbach is responsible and contractually agreed dates must be adjusted accordingly. If additional costs arise for Kaltenbach as a result of the deployment of personnel for installation, commissioning and service at the customer's location, Kaltenbach will communicate these additional costs and bill them to the extent actually incurred. When the order is placed, this becomes an integral part of the contract.

INTELLECTUAL PROPERTY, REFERENCE AND RESALE

Technical alterations in respect of current and further developments concerning construction and manufacturing technology are reserved. In case the Equipment includes newly developed parts/components, Kaltenbach is entitled to substitute these newly developed parts/components by Kaltenbach parts/components which are proven and best practice. In such case, the conditions with regard to price etc. shall be reasonably adjusted.

The customer hereby grants Kaltenbach the non-exclusive right to give the name of the customer as a reference and, in conjunction with it, to use communication materials for marketing, sales and advertising purposes. The communication materials include logos, trademarks, trade names as well as illustrations and photographs, which the customer makes available to Kaltenbach or created by Kaltenbach.

The buyer acknowledges that he is not entitled to resell spare parts for our Kaltenbach systems to third parties for commercial purposes, in particular on Internet platforms or in online trading, and that this is hereby expressly prohibited.

Excluded from this are affiliated companies and dealers of the Kaltenbach Group as well as the resale to affiliated companies of the buyer.

PAYMENT CONDITIONS

40% down payment immediately after order placement.

60% against irrevocable letter of credit, confirmed by and available with our bank by payment at sight. L/C to be opened latest 6 weeks before EXW delivery date in our favour with a first-class domestic bank. Partial shipments must be allowed. Kaltenbach will issue a L/C draft and send it to the customer. If the irrevocable L/C was not opened latest 6 weeks before EXW delivery date, we reserve the right to fix a new date of delivery.

All taxes, duties, bank commissions and charges outside Germany related to this offer have to be paid by the buyer. All taxes, duties, bank commissions and charges inside Germany related to this offer will be paid by us.

In case of overdue payment, the seller reserves the right to charge reminder fees and default interest.

If the buyer does not fulfill his obligation to pay the down payment despite two written requests, the seller is entitled to withdraw from the contract. In the event of withdrawal from the contract, due to non-payment, the seller shall be entitled to a lump-sum compensation of 5 percent of the total order value (gross) as compensation for damages incurred and loss of profit. The seller does not have to prove that he has suffered any damage at all.



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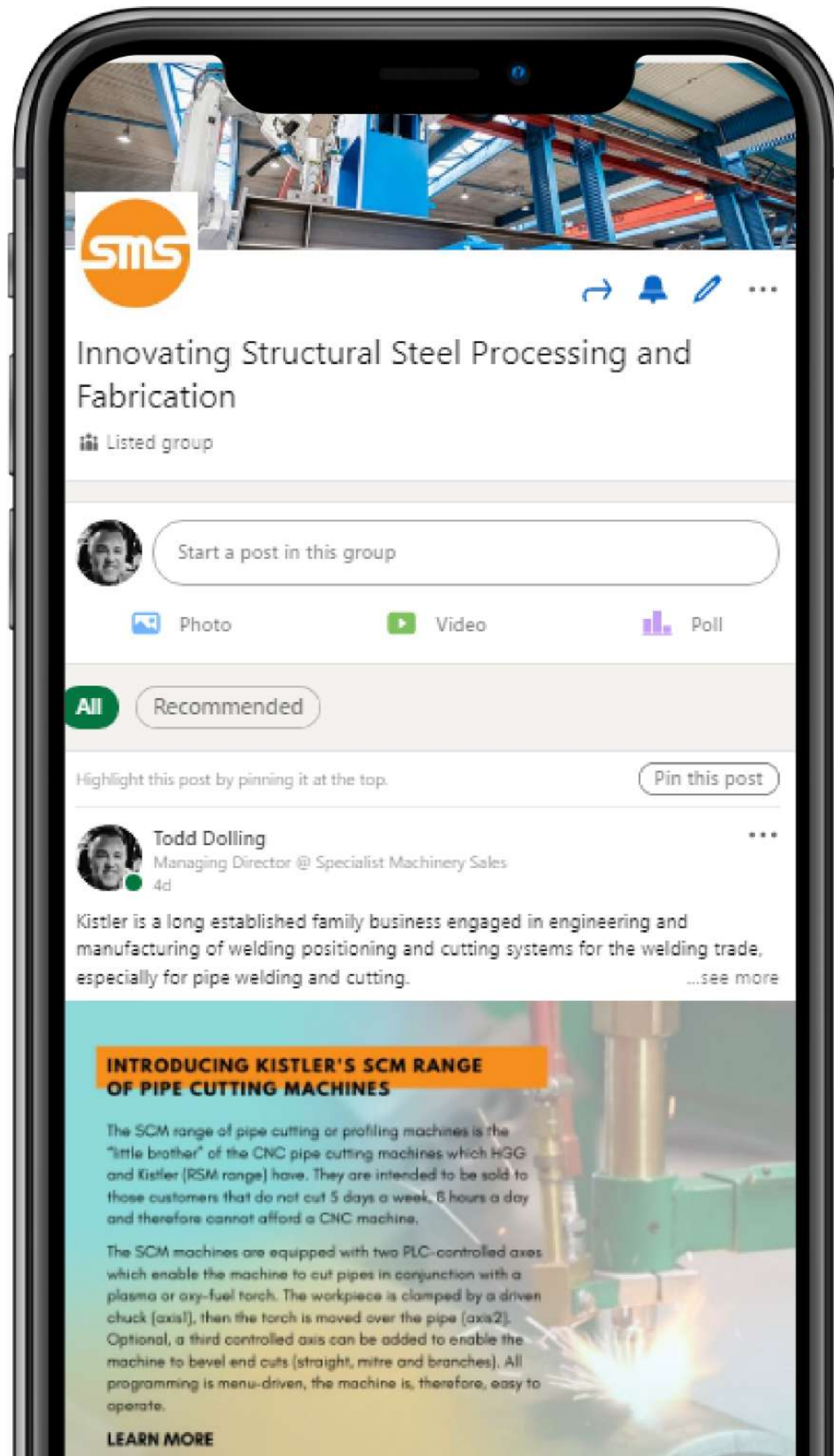
TERMS AND CONDITIONS

LEASING AND FINANCING INSTITUTIONS

If, after conclusion of the contract, the buyer concludes financing of the object of purchase by a leasing or a financial institution, he shall ensure that – even if the leasing or financial institution joins the contract – the agreed terms and conditions of the contract remain unchanged. In particular, the buyer is responsible for ensuring that the agreed payment terms and dates are not changed as a result of a leasing or financial institution becoming a party to the contract. The buyer guarantees this to the seller.

PLACE OF JURISDICTION

The place of jurisdiction for all disputes arising from and in connection with the contractual relationship is Lörrach, Germany. The seller (Kaltenbach) is, however, at his discretion free to take action against the buyer at the courts responsible for his registered office.

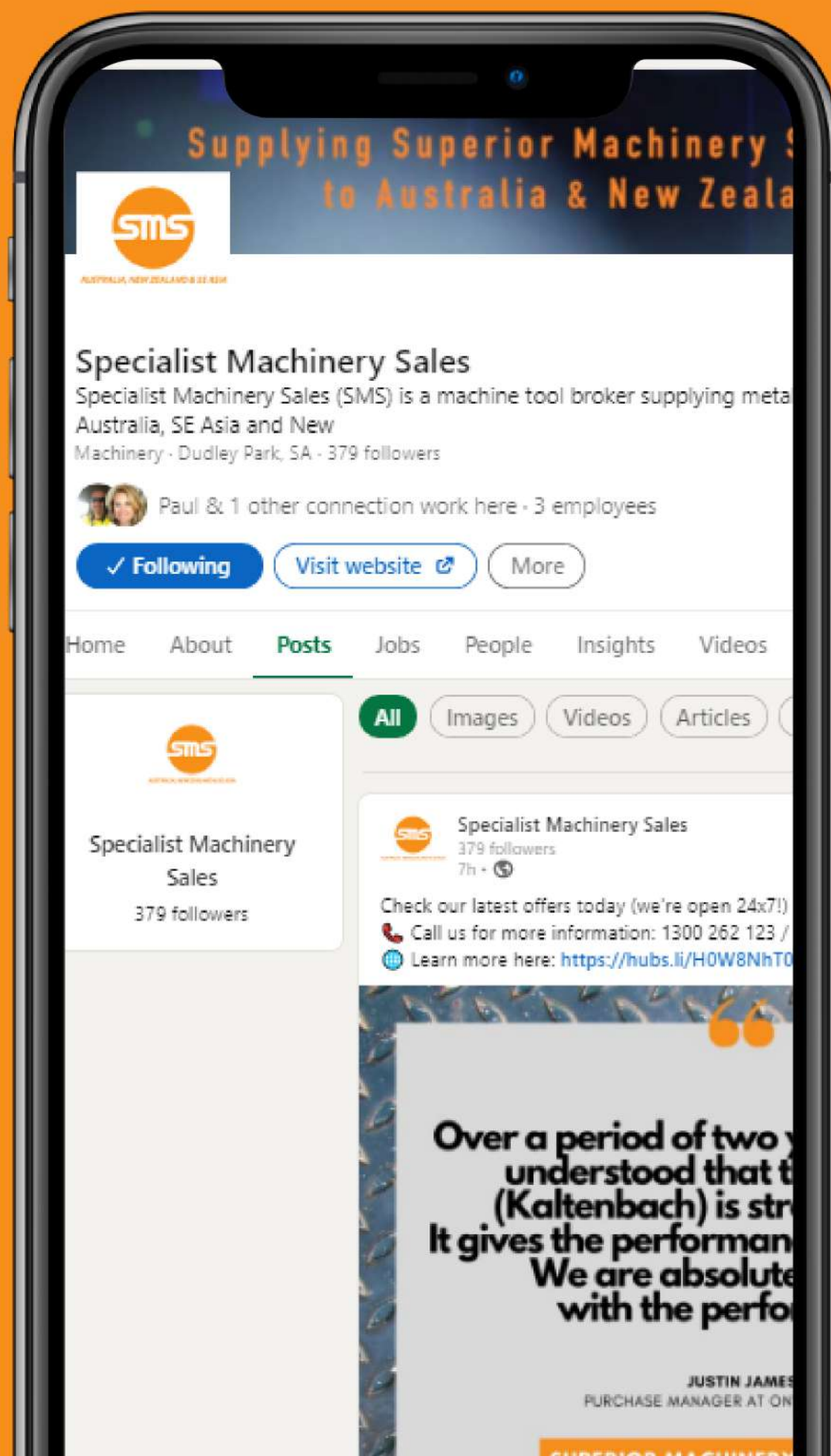


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