

The Bend
The Combi
The Laser
The Punch
The System
The Software

**Servo-electric bending automation
by Prima Power**

A breakthrough in the productivity of bending: servo-electric automation by Prima Power

The right configuration for each application



FASTBEND (FBc)

FastBend replaces the press brake with the automatic bending technology which allows more bends for each side in an automatic sequence without any manual intervention; only loading, rotation and unloading are manual. Also positive/negative inversion, smashing and radius bends can be made.

The machine can be operated in two different modes. In the standard mode the part is automatically fed during the bending sequence of every side. In the press brake mode the sheet is moved manually bend by bend, which allows the processing of very narrow profiles.

Applications:

Single piece production
Kits of components
Narrow components
Fully perforated material



PROCESS BENDING CENTER (BCc)

The operation of BCc is semiautomatic. It is a productive solution for small batches as well as for serial manufacturing. Total manufacturing time is shortened as the loading operation is simultaneous with the unloading of the ready-bent component.

The BCc configuration consists of a basic unit (bending press and a programmable manipulator with rotator) plus loading table with brush top, a programmable part feeder, and driven rolls in the unloading table, which are the material handling modules.

Applications:

Single piece production
Kits of components
Fully perforated material
No stackable sheets
Bent components with small minimum dimension

Applications vary, and so do optimum choices in manufacturing technology. As a full range supplier, Prima Power provides several different solutions for productive bending of sheet metal components:

- **SERVO-ELECTRIC PRESS BRAKES**
- **SERVO-HYDRAULIC PRESS BRAKES**
- **SERVO ELECTRIC BENDING CENTERS AND CELLS**

In many manufacturing situations automatic bending cells and centres offer benefits and superior advantages in terms of:

- Total manufacturing cost reduction
- Machine set up time null
- Excellent component quality
- Flexibility of small series production
- Off-line programming

The predecessors of today's Prima Power bending centers were introduced more than two decades ago. Since then, continuous, innovative development has elaborated the technology, adding further versatility and improving accuracy and flexibility.

A revolutionary step was taken in 2004 on the introduction of a servo-electric bending cell. Automation itself means a major reduction in manufacturing cost. Combining automation and the superior bending precision, surface quality and low operating and maintenance cost of servo electric technology, today's Express Bender solutions mean a real revolution in high-quality bending.

Servo electric bending benefits include:

- Lower bending cost by more than 60 % savings in energy and 70 % in maintenance cost
- Higher component quality
- Faster and smoother operation
- Shorter set-up times
- Flexibility in small series production
- Off-line programming
- Compatibility with modern environmental thinking



EXPRESS BENDER (EBe)

Fully automatic in loading as well as in unloading operation, the Express Bender has a loading device with automatically adjustable gripper and a loading table with double sheet detector. A standard unloading table with free rolls allows the operator to remove the ready finished components while remaining in safety area.

Applications:

*Medium to long series manufacturing
Large components
Fully automatic process in loading as well as in unloading*



EXPRESS BENDER (EBe FM)

Flexible, modular solutions for automated material management are a major Prima Power strength. The EBe bending cell can be upgraded by a range of options which prolong unattended operation. As in the stand-alone EBe, the machine is equipped with an automatic loader and an unloading table.

Applications:

*Single piece production
Kits of components
Production of small, medium size and large component batches
Integration in Flexible Manufacturing Systems*

Express Bender: solid



Express bender by Prima Power : The optimum combination

Force – applied gently

Precision plus speed

Flexibility with automation

High productivity – low operating and maintenance cost

Open programmability with user-friendly operator interface

High reliability with lower maintenance requirement

engineering and sophisticated features

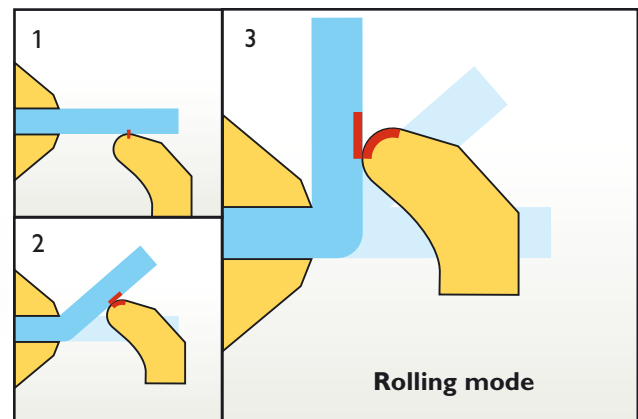


During the bending action, the upper tool of the bending unit holds the required portion of the sheet in the proper position. Two blades, mounted on the C-frame, manipulate the protruding portion of the sheet. The C-frame moves vertically and horizontally. The motion is programmable according to material type and the required bending angle. The bends can be made either upwards or downwards, depending on whether a positive or negative bend is required, without turning over the piece.

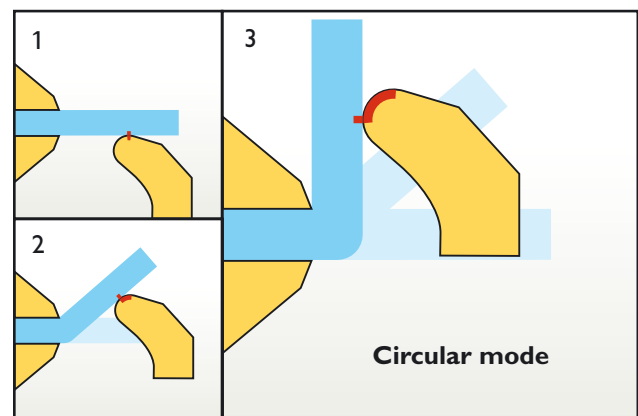
New bending principle with interpolation of blade movements

Optimum surface quality is a decisive factor in many bending applications. The Prima Power solution offers a choice of two interpolation modes of operating blades.

When the “rolling mode” is used, there is no relative friction between blade and material, which saves the material surface from damages and reduces wear of the blade.



Alternatively, when using the standard “circular mode”, the contact point remains constant whereas the contacting point of the blade changes during the bending movement. The contact line of the blade to the material being bent remains constant. These two modes are achieved by numerically controlled interpolation of the two axes that operate blade movement.



Operating Principle

Express Bender uses modern CNC-controlled electrical servo drive technology, which is the best solution for precise interpolation of several axes.



CNC control exchanges information and synchronization with PLC through digital communication. All main machine functions and all axes involved in the bending process are numerically controlled.

The Express Bender works the edges of the panel. Generally, the process starts at the external edge of the sheet and continues to the inner part of the sheet, working one side after another in sequence until all bends have been completed.

Standard features

Frame

The construction has two frames: the stationary main frame (1) and the C frame (2). The main frame is a robust, welded structure that provides the necessary rigidity for withstanding the forces generated during the bending phases. The C-frame mounts within the main frame and supports the upper and lower bending blades.

Upper Tool

The upper tool (3) consists of a bar and segments that can be composed to match the size required by the work piece and to contract for part exit. It is assembled to a welded structure with arms hinged to the rear part of the main frame.

Upper tool movement is performed through eccentric shaft mechanisms, actuated by two NC-managed servo electrical motors, controlled by numerical control.

Lower tool

The fixed lower tool (4) holds the work piece in position during the bending procedure. It consists of a single element that is fitted to base beam screw it to the main frame.

Bending Blades

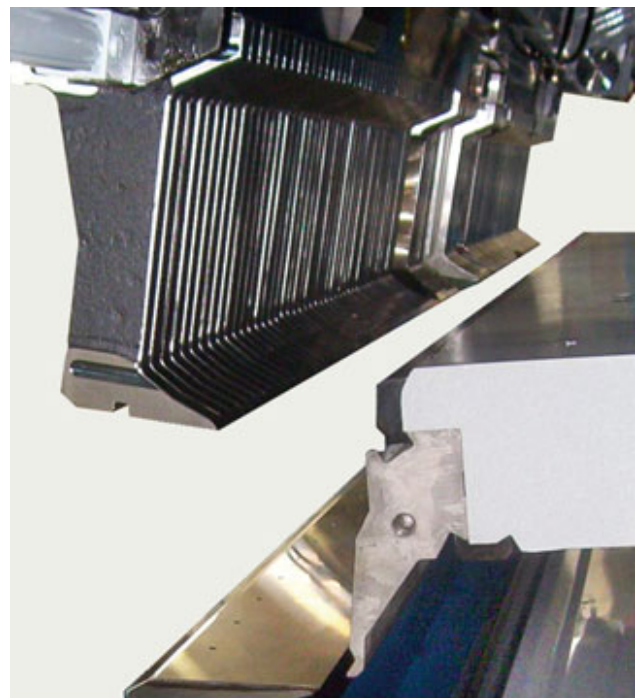
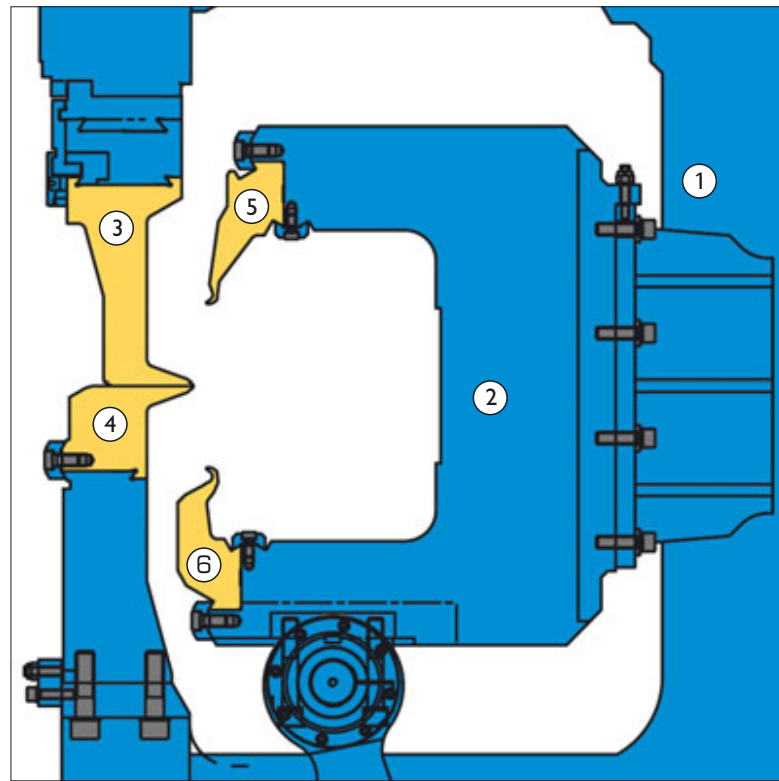
The C frame is moved horizontally and vertically by two crankshafts and a connecting rod mechanism managed by servo electrical motors controlled by numerical control.

There are two bending blades, the upper one (5) to make negative (downward) bends and the lower one (6) to make positive (upward) bends.

Bending Tools plus HTC (hydraulic tools clamping)

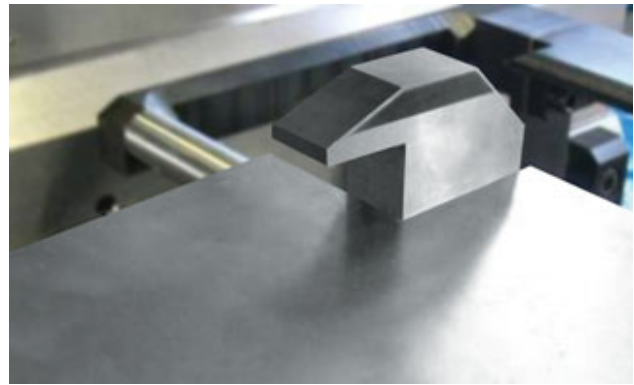
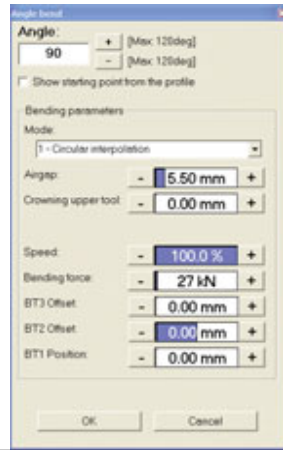
The Express Bender is equipped with a standard set of tooling, with which the majority of bending requirements can be met. Changing upper tool dimensions is facilitated and made faster by the HTC device.

The upper tools are hydraulically clamped to the tool-holding bar. A holder clip is included in each tool segment for secure fastening. In order to change the upper tool dimension, the operator simply unlocks the hydraulic clamp and presses a clip to move the segment into the new required position. Average tool change time without the ATC option is approximately five minutes.



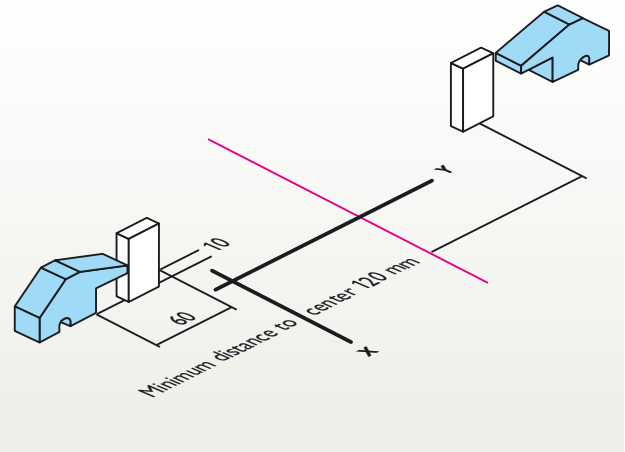
Programmable upper tool crowning device

The movements of this device are actuated by proportionally controlled hydraulic cylinders. The mechanism can flex the upper tool structure and, consequently, the tools. It is used for correcting the straightness when bending thick material or long bends.



Work piece positioning pins

The two positioning pin units support two pins each (main and secondary) and they are used at the beginning of the cycle to square the new part correctly. They are mounted on the lower tool bar support frame and are individually controlled by 3 CNC axes. The left unit is moved in X,Y directions by two NC axes, the right only in Y direction.



Brush Table Tops

The Express Bender worktable is equipped with brush tabletops for better material support, noise reduction and minimal surface scratches.

Manipulator

The manipulator performs all sheet movements once the sheet has been loaded onto the machine table, i.e. positioning, rotation and all progressive movements for bending.

Automatic panel positioning is accomplished by use of retractable positioning pins and by a pneumatic CNC pusher cylinder. The manipulator, driven by a CNC controlled axis, consists of a carriage mounted on linear guides and is operated by a ball screw. One arm, with a rotating CNC device, is mounted on the carriage of the manipulator for moving and rotating the piece during the bending procedure. The rotator reaches any angle necessary through the 360° (0.1 degree steps).

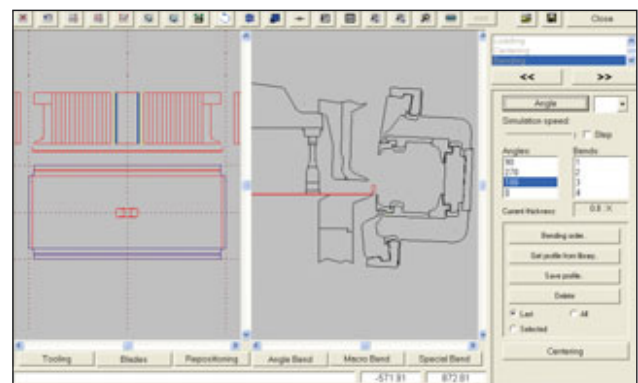
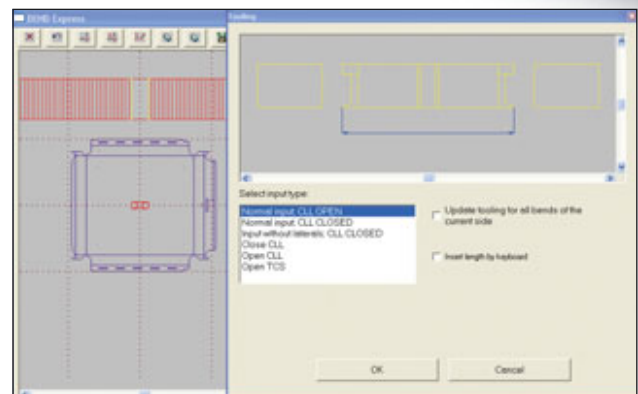




CNC Control Unit

An on-board PC and a colour display provide a user friendly machine operator interface.

The numerical control system consists of NC control and programmable logic, controlling the functions of both the bending unit and its peripherals by digital communication. The CN and PLC system with its electrical components are mounted in an electric panel.



BendExpress

BendExpress is a Windows® based application, which runs on PC. It is a graphical machine user interface on a Windows® XP Personal Computer.



Hydraulic Unit

A small hydraulic unit (less than 90 litres of oil) is necessary for the remaining hydraulic movements. It is integrated (but easily accessible) in the manipulator table area.

Unloading Conveyor and Unloading Table

The belt conveyor in the working table unloads the finished piece from the working table onto a free roll table of the unloading station. The belt conveyor feeds the part onto an inclined table with free rolls, from which the operator removes it.



Safety devices

Depending on the model chosen each machine is equipped with safety equipment fulfilling CE requirements. The operative area of the machine is separated to prevent anyone from entering the danger area during machine operation.

Teleservice

The machine is equipped with Teleservice as standard. If the customer provides a direct telephone line or internet connection to bending machine by one modem router installed in the electrical cabinet, Prima Power can support the operator in problem cases. Further, the software can be updated via Teleservice.



PRIMA POWER TELESERVICE



CCC Control Cabin Cooler

Acceptable electrical cabinet temperature can be maintained by a cooling unit (standard). With the cabinet cooler the ambient temperature allowed for the machine is max. 45°C (100°F). Max. relative air humidity is from 20 % ...75 %, temporary max. 90 %



Green Means®

Under the banner Green Means® Prima Power provides solutions for both productivity and more sustainable manufacturing. Servo electric technology is a major but by no means the only element in this approach.

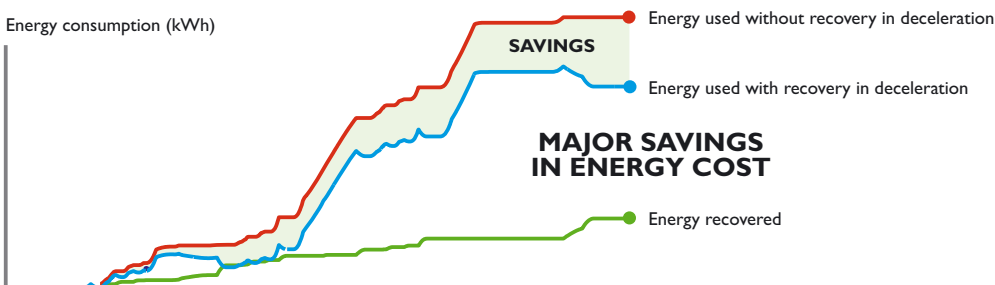
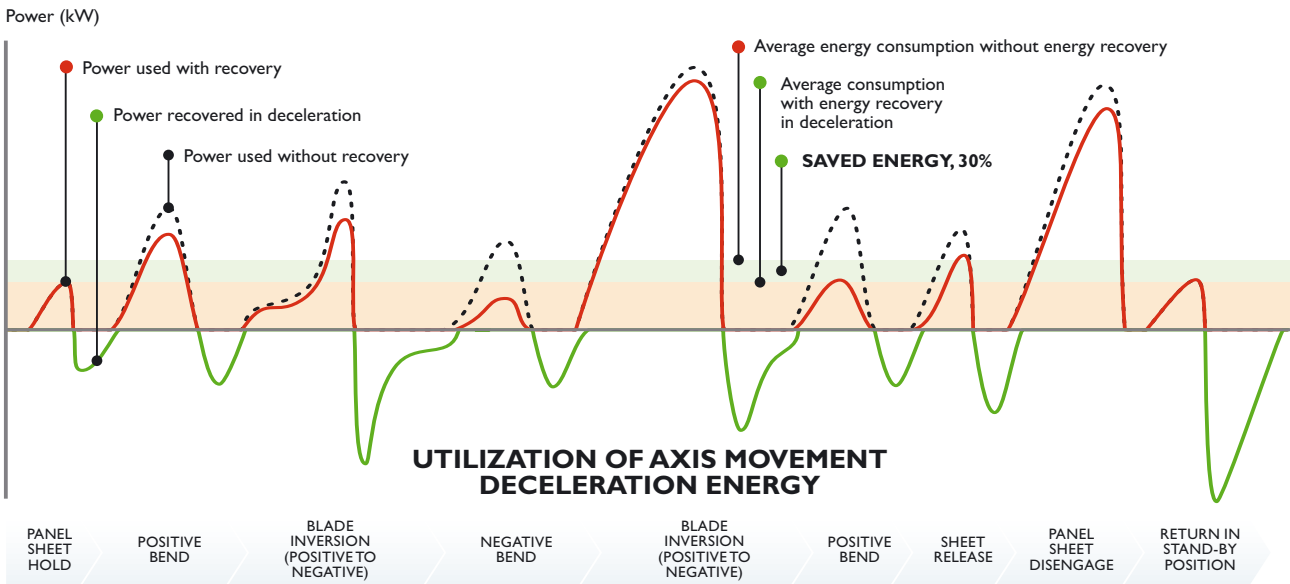
In many ways, servo electric solutions simply perform technically better than alternative ones. This forms the basis of productivity, and on top of that come the inherently low energy consumption and maintenance cost, which mean truly significant cost savings in the course of time.

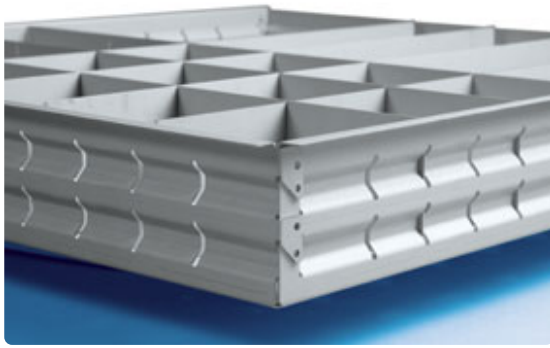
Since environmental considerations become more and more important, servo electric technology is part of the corporate image of modern companies committed to ecologically sustainable operation. The Green Means® approach allows this and the production of high-quality components at a lower cost.



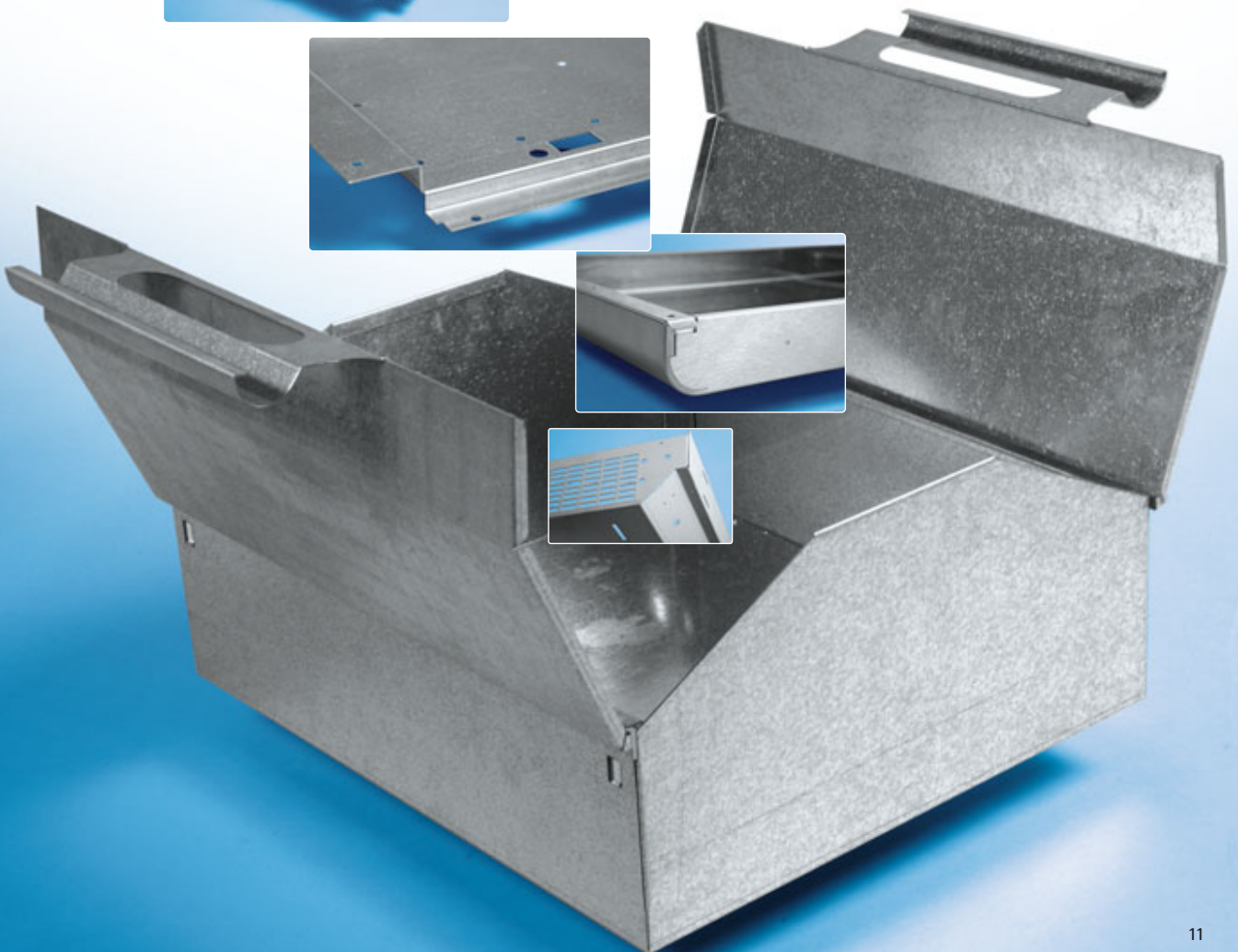
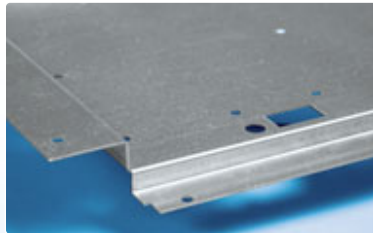
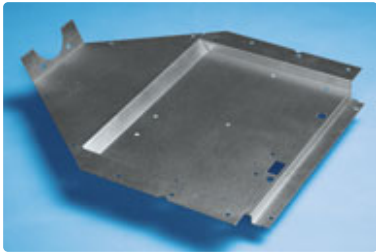
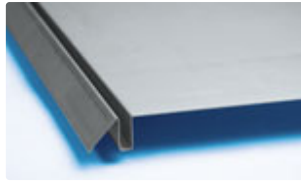
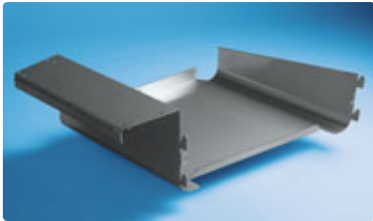
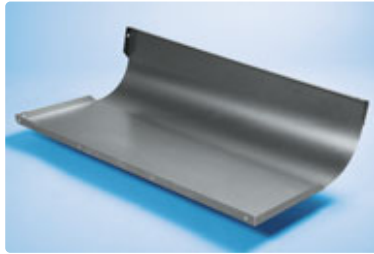
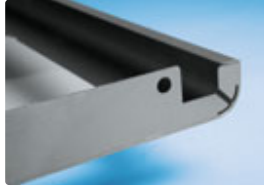
What does Green mean?
Green means a win-win for you and sustainable development.
Sustainability adds to manufacturing efficiency and productivity.
Your customers, your employees and the community you operate in demand it more and more.
Sustainability & social responsibility are characteristics of a modern company and add to competitiveness.
They make a difference between the best and the rest.
And you make better sheet metal components at lower cost.

Energy recovery in bending automation





The optimum bending result in every application



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