



## TECHNICAL AND COMMERCIAL PROPOSAL

No. N40513 rev1

**CELSA GROUP**



**COPEX HYDRAULIC SHEAR PRESS WITH SIDE COMPRESSION  
TYPE LIDEX 1000t / 800/ 8m / 4x110 kW**

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### 1.1. Shear

LIDEX Shears have cutting rates higher than 7 cuts per minute for the fastest. These performances are explained by the use of the most advanced technologies such as:

- Two pressure lines that allow simultaneous feeding of the shear and the hold-down,
- The transfer of oil from the hold-down to the shear cylinder during their ascent,
- Analogical instrumentation of displacements and pressures in the cylinders, for a better control of the movements,
- Proportional control of the two pressure ramps ensures smooth operation.

The surface of the slide block resting on the frame (blade side) is covered with wear plates. In this way, the structure of the slide block is entirely protected.

The slide block is equipped with a rail-breaker which facilitates the breaking of rigid elements before the blade will cut them. With this device, the service life of the blades is significantly increased.



#### **Hard and brittle scraps (such as rails):**

A sequence valve located on the hydraulic circuit of the shear is used for regulating the down movement of the shear, using the maximum power and perfectly controlling the movement.

After the material has been cut, and even in case a sudden break would occur, a counter pressure is immediately produced, for compensating the proper load of the slide-block.

This system is entirely hydraulically and instantaneously working, not requiring any reaction time from the PLC.

**Hydraulic fastening of blades (option)**

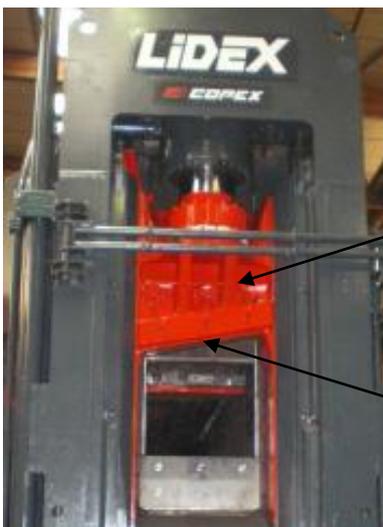
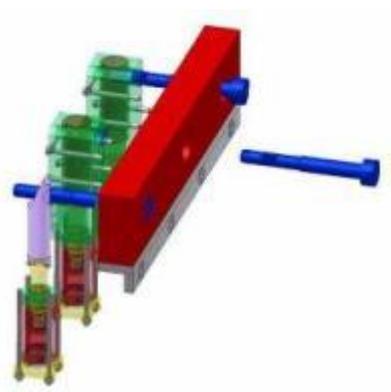
Optionally, the LIDEX can be delivered with a hydraulic and automatic blade fastening system. Through the permanent control of locking pressure of blades by the PLC, the operation of the system is absolutely safe.

All operations involved by a replacement of blade are done from the working platform. Ergonomics and working safety are optimized.

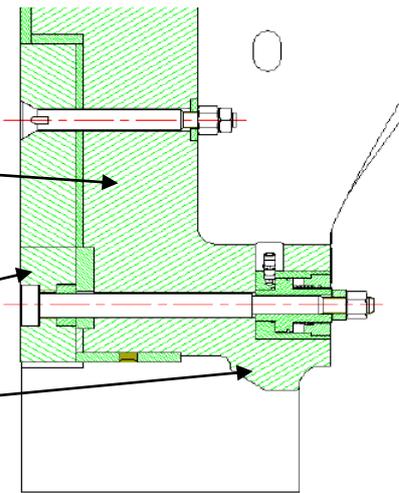
The fastening of the lower blade does not require any bolt.

Through the double effect cylinder the blade can be locked and unlocked without requiring any action from the operator.

The fastening of the slide block blade requires hollow cylinders which exert a permanent tension on screws.



Slide block  
Upper blade  
Breaking bar

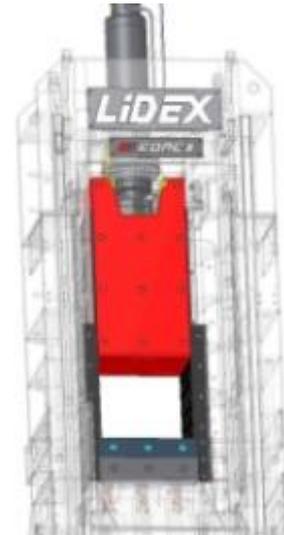




## 1.2. Hydraulic hold down

The big height of the hold down gives an excellent guiding made of HARDOX 500 wear plates.

The analogue detection system of hold down movements is integrated inside one of the cylinders.



## 1.3. Compression box

The LiDEX compression box offers outstanding compacting performance that results in a 50% reduction in closing time.

These performances are based on:

- The kinematics of the loading bucket when discharging the scrap materials,
- The very large amplitude of the lid that covers 80% of the surface of the box,
- The impressive closing power of the lid,
- The over-stroke and the significant compacting force of the side press piston,
- Simultaneous control of two movements between the lid, the side-press piston and the loading bucket.



Thanks to this closing efficiency, the LiDEX is the first side compression shear press to offer fully automatic operation from the dumping of scrap into the box to the final shear cycle.

The versatility of the LiDEX results in an excellent ability to make bales directly against the shear cylinder of the shear head. The standard supply includes a 120 ton pusher. Optionally, the quality of the packages can be improved by the installation of a pusher of 200t (option).



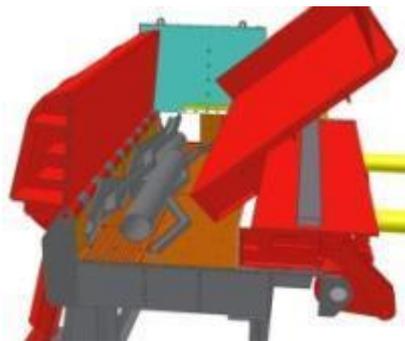
The compression box is covered with wear plates of HARDOX 500 in the pusher cylinder area and HARDOX 450 in the other parts.

The wear plates under the pusher cylinder are grooved to avoid any risk of jamming of thin plates under the cylinder.

## 2.7. Loading bucket

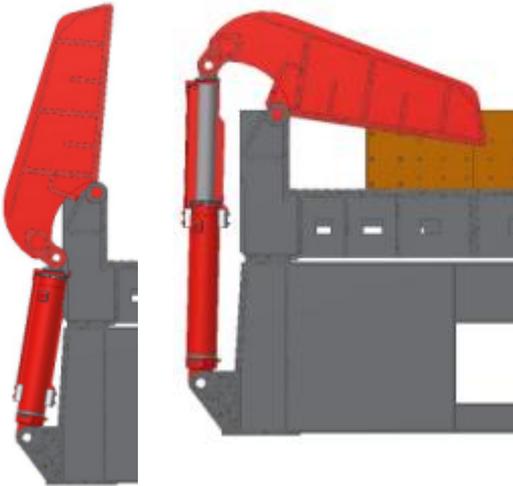


The loading bucket allows to load the scraps as a background task and facilitates a qualitative sorting of the materials.



Through its innovative kinematic design **the loading bucket is able to discharge the scrap directly under the lid**. The number of movement of the lid and side-press piston is reduced allowing a fast closing of the box.

### 1.5. Lid



The lid covers **80% of the surface of the box**. This large amplitude allows the lid to wrap any type of scrap and accelerate the closure of the body.

The lid develops its **maximum power at the end of closing**, where it is most useful.

The lid has a large over-stroke to allow more efficient compression.

The cylinder rods are fully protected.

The analogue detection system of lid movements is made by means of a magnetostrictive sensor located outside of one of the cylinders.

### 1.6. Side press

The movement of the side press piston can be carried out simultaneously with that of the lid.

Depending on the width of the bale the side press cylinder can move forward from 100 to 300 mm inside the pusher area.

The rudder bar consisting in one large tube is connected to the box by means of two greased hinges fitted on bronze rings.

The piston is guided on its whole stroke in height and on both sides in maxi forward position.

The scraper in the box bottom is optimized and offers protection against the risk that scraps get under the side press piston.

The analog detection of the side press piston is carried out by a perfectly protected laser rangefinder, protected from any risk of shock during handling of scrap metal.



The analogue detection of the side press piston movements is made by means of a laser remote measuring sensor fully protected against any risk of chock during handlings of scrap.

### 1.7. Longitudinal pusher

The pusher piston completely covers the top and sides of the cylinder rod over its entire stroke.



The pusher piston rests on grooved wear plates made of **HARDOX 500**. The rod of the pusher cylinder is thus particularly protected against the risk of scratching related to the return of scrap.

The precision and reliability of the cutting length are guaranteed by the integrated laser rangefinder protected inside the pusher piston. The selection of the cutting length is simply done on the radio control or the control screen.

## 2. PERFORMANCE AND TECHNICAL DATA

### LIDEX 1000t / 800 - box 8m x 2m - 4 x 110kW

SHEARING DEVICE			
Shearing device	Shearing force	1000 t	
	Cutting width	800 mm	
	Shearing angle	11°	
	Cutting length	50 to 1 000 mm at a pitch of 50 mm	
Hold down	Width	800 mm	
	Length	600 mm	
	Height underneath	700 mm	
	Hold down force	200 t	
Cutting capacity	With steel S235 (according to EN 10025). Steel strength $R_m = 37$ daN/mm <sup>2</sup>	Round	Ø 225 mm
		square	200 mm x 200 mm
		Plate	800 mm x 120 mm
PRECOMPRESSION BOX			
Box	Length	8 000 mm	
	Width	2 000 mm	
Side press	Compression force	400 t (2 x 200 t)	
	Length	8 000 mm	
	Height	600 mm	
Lid	Lid cylinders force	310 t (2 x 155 t)	
	Force at the middle of pusher chamber	500 t	
	Width	1 600 mm	
Pusher	Pusher force	120 t	
	Pressure on product	25.6 kg/cm <sup>2</sup>	

Loading bucket	Length	7 830 mm	
	Width	2 750 mm	
Bales	Section	780 mm x 600 mm	
	Maximum density	1400 kg/m <sup>3</sup>	
<b>HYDRAULIC SYSTEM</b>			
Hydraulic power	Number of motor-pumps group	4	
	Power of each unit	110 kW	
	Variable axial piston pump (high pressure)	Unit	4
		Flow	420 l/mn
		Pressure	350 bars
	Paddle pump (low pressure)	Unit	4
		Flow	290 l/mn
Pressure		105 bars	
Maximum flow	2840 l/mn		
Filtration and cooling circuit	Power	22 kW	
	Output of filtered oil	880 l/mn	
	Number of coolers	2	
	Oil temperature	50 to 55° C	
Tank	Oil tank	8 000 l	
	Volume of oil necessary for the whole hydraulic circuit	12 600 l	
<b>PRODUCTION DATA</b>			
Cutting performances	Cutting frequency	4 to 7 cuts / mn	
	Production capacity (scrap)	16 to 42 t/h	
Production of bales	Number of bales per hour	30 to 50	
	Hourly production (scrap)	20 to 50 t/h	

Productions rates depend on the material density, the machine feeding way and the cutting length.

### 3. HYDRAULIC EQUIPMENT

#### 3.1. Hydraulic installation

The oil transfer is done on 2 separate pressure lines. It makes a movement combination of various cylinders possible.

Movements of lid and side-press on the one part, and of hold-down and shear on the other part, are **simultaneously activated**, which eliminates the unproductive times.

A system of integrated valve allows **retransferring the oil coming out the hold-down cylinder for feeding the shear** during movement phases which do not require much pressure.

Through the reduction of cycle times, significant production gains can be reached.

An electro-valve directly integrated into the pump is used for cancelling the flow when this pump is not under strain. So the **energy consumption and the unnecessary oil heating can be considerably reduced**. Those pumps are also much more silent, especially when they are in stand-by.



### **3.2. Hydraulic tank**

The oil level, the design of the tank, as well as the pumps suctions, guarantee optimized supply of the pumps during delivery accelerations.

An integrated retention tank facilitates maintenance operations.

The control of oil temperature and level is made by means of analogue transducers which display information to the PLC in real time.

### **3.3. Cooling system and filtering system**

Cooling and filtering of the oil is ensured by permanent circuits which are separate from the power circuit.

The filtration fineness is 5  $\mu\text{m}$ .

### **3.4. Distribution**

A bored block centralizes all safety and distribution functions of all pumps toward the 2 pressure lines.

This solution is ideal as it limits the number of connections and allows a more compact and reliable construction.

The blocks for the box and shear are located under the chassis, so that they are protected against scraps which might fall down.

### **3.5. Pipes**

All pipes are formed, welded and assembled in factory.

The trials which are carried out with the machine before dispatch allow test the tightness of all connections to their maxi operating pressure.

All connections used have normalized flanges depending on their diameter and operating pressure:

- SAE 3000 and CETOP PN 250 in case of nominal pressure inferior to 250 bars,
- SAE 6000 and CETOP PN 400 (burst pressure at 1200 bars).

### **3.6. Lubrication system**

The automatic greasing for the shear head is made by means of a multi-point piston pump and the progressive valves which guarantee optimal pressure and dosing on each point.

- . Motors with electronic progressive starter
  - . Motors
  - . Watertight electrical cabinets
  - . Connection bars and covers suitable for copper cable.
- Protection IP 55, class F  
Protection IP 55

#### 4.1. Equipment for control

The installation is controlled by means of a **SIEMENS PLC**. The program is specially developed by COPEX to optimize the control of hydraulic functions.

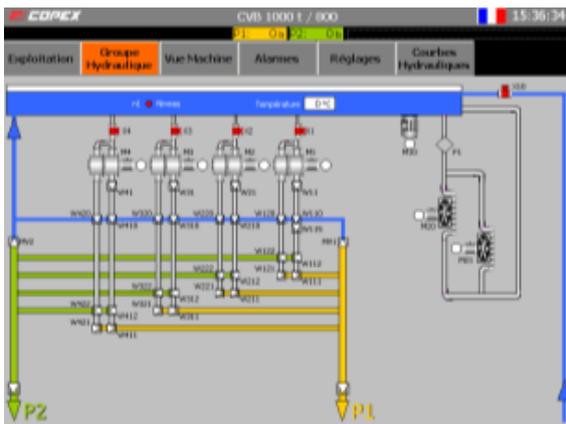
Using analogue transducers installed in the various movements, the PLC has in continuous all reliable information about position of the mobile parts of the machine. This allows a more accurate and efficient control/management the movements.

Analogue transducers transmit the pressure value of each portion of the hydraulic circuit in real time, delivering to the PLC the necessary information for the optimal working of the hydraulic system.

##### 4.1.1 Multi information terminal

A LCD touch screen displays all information regarding the shear press, and data about the state of the sensors and manipulators in real time.

The operator has all information available on the progress of each movement. Ha can also have very easy access to production parameters.



A detailed graphic display of the hydraulic group allows checking the working of the components of the installation.



All data are available for the maintenance, and permit planning of maintenance operations. These valuable information help carrying out efficient analysis of events.



#### 4.1.2 Radio remote control

The radio remote control is used for driving the machine for instance from a crane in a yard.

It has 54 channels and a reach of about 300 m.

#### 4.1.3 Remote maintenance by modem

COPEX can take hold of the machine in a remote way through a simple phone line.

The PLC is connected to a telephone modem, allowing the COPEX after sale service to make the following in a remote way while the machine is running:

- View the history of events,
- Check and modify the inputs- outputs,
- Display the progress of a GRAFCET cycle,
- Modify the cycle parameters.

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## 5. OPERATION

### 5.1. Manual operation

All movements of the machine are accessible manually from the control unit. The maintenance and setting operations get easier.

The movements are managed by the logic controller, which protects the machine against any handling operation which could be damaging (for example: coming down of the shear when the pusher is at maximum forward stroke).

A mobile box is available on the shear frame with the control of the shear and the pusher to facilitate the handling operations while changing blades.

### 5.2. Automatic operation

The operator has on the radio remote control all controls for the machine, including the setting of cutting length.

Once the bucket is loaded, the operator starts the automatic cycle. The automatic compression cycle is started through various movements until the complete closing of the box. The PLC controls the good completion of the cycle and the operator can take hold of the machine if necessary.

Once the box is closed, the cutting cycle starts automatically. After loading the bucket, the operator is not required for conducting the compression and cutting phases and has time for other operations.

The automated compression cycle allows to make very important production gains.

Various automatic cycles directly accessible offer the LIDEX an absolute flexibility:

- Automatic closing of the box,
- Standard shear cycle for the cutting of common scraps,
- Shear cycle “Rail-breaker” for the cutting of products with high hardness,
- Bale cycle for producing bales.

All the mentioned cycles can integrate a step “material ejection” for ejecting the scraps at the end of the cycle.

## 6. MAINTENANCE

As high quality maintenance conditions considerably contribute to the long term performance of a machine, the LIDEX has been developed striving for simplifying and reducing to a minimum maintenance operations, for example:

- Supply a removable platform and specific tools to make it easier to replace blades,
- The necessary controls for changing blades are centralized on a specific control box and accessible from the platform,
- Keep free access to the sides of the side allow to control guiding without requiring any disassembly operations,
- The supply of specific tools for facilitating the disassembly of the slide block,



The touch screen allowing to make quickly and without any disassembly operations a lot of controls essential for the good running of the machine :

- Check operating pressure of all pumps of the power circuit,
- Check tightness of cylinders,
- Check analogue transducers,
- Check machine safety functions,
- Etc.



## 7. CONSTRUCTION

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The construction takes place in our workshops according to the regulations we have issued for guarantying a high quality production.

Every part is detailed in a separate file in which the tests to be carried out and the corresponding results of the test are indicated.

After and of manufacture and assembly, the machine is started and tested in our workshop. At the end of under-load trials, an Equipment Acceptance certificate in factory is issued.

## 8. PAINTING

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Preparation of the plate by sandblasting (except the wera plates).

Antioxidant paint

Paint thickness: 100 microns

COPEX colours:

- Structures in grey (RAL7016)
- Mobile parts in red (RAL 3020).

## 9. SAFETY

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Our equipment is in compliance with the requirements of current legislation. A EU-compliance certificate will be given to you along with the operation and maintenance instructions manual.

## 10. SCOPE OF OUR SUPPLIES AND SERVICES

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- One (1) unit of new LIDEX 1000t/800 COPEX hydraulic scrap shear as described in the present technical specification,
- The foundation bolts for the assembly,
- The adjusting wedges for the assembly,
- The assembly of the machine in our workshop in France, in full compliance with the “real” conditions of the Buyer’s installations, including the hydraulic and electrical fittings. This will lead to the issuance of an equipment acceptance certificate signed by the Seller and the Buyer,
- The program training for your operators who will have in charge the running and the maintenance of your machine, this training will take place in COPEX plant during the week before commissioning,
- The supply of a general layout plan to make the foundations as per configuration agreed on between the Buyer and the Seller,
- The supply of the complete documentation including user manual, maintenance manual in English,
- The technical supervision of the assembly, starting and commissioning on site (customer will supply its staff during those operations).
- The transport.



## 11. EXCLUSIONS FROM THE SCOPE OF SUPPLIES

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- The civil engineering and the foundations,
- The handling cranes and equipment for unloading and erection on the final site,
- The local staff necessary for the assembly in site,
- The grounding,
- The oil required for first filling,
- Any safety fencing required to prevent access,
- The power supply transformers and cables, Any supply or service not specifically described in our offer.

## 12. COMMERCIAL PROPOSAL

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### 12.1. Prices

Our prices are given CPT Cardiff, Great Britain, Incoterms 2010.

#### **TOTAL FCA PRICE for**

#### **1 hydraulic scrap shear type LIDEX 1000t/800**

Including: radio remote control, remote maintenance by modem, access footbridge for replacing blades, grooved wear plates in the pusher area (HARDOX 500)? technical supervision of the assembly, starting and commissioning on site

- Transport
- Locking of upper blade (blade of slide block)
- Extraction and locking system for lower blade
- Automatic greasing

**Total Price CPT Cardiff, Great Britain (Incoterms 2010)**

**Exceptional discount of**

**Net price including discount**

**VALIDITY OF OFFER : 2 months**

### 12.2. Payment terms

The above price is based on the following conditions of payment:

- 30 % down payment by swift transfer,
- 30 % at mid-delivery term by swift transfer,
- 30 % after final inspection in factory and before despatch of the machine, by swift transfer,
- 10% after final inspection on site by swift transfer.

Payment of the 70% through irrevocable and confirmed Letter of Credit.

### 12.3. Delivery time

The machine shall be ready for despatch on Ex-works basis within **12 months** (depending on the production load at COPEX) after signature of your order and reception of 30% down payment.

### 12.4. Warranty

COPEX warranty is valid for a period of **12 months** or **2000 operating hours** after acceptance of the Equipment in factory (first term occurring).

The warranty lid the supply of labour and spare parts only, provided that the operation of the machine has been normal, as well as its maintenance with a regular keeping of maintenance book.

NOTE: The warranty does not apply to parts subject to normal wear and tear (filters, oil...).

Lanester, 22 November 2018

Frédéric MALIN  
Chairman & CEO

