

**3. Description of the Subject of Order**

- 3.1. This Call for Offers concerns the process of selection of a Supplier of a technological process line for deep drawing of large-dimension articles in scope of supply, installation, configuration, and commissioning in the Firma Tarapata Sp. z o.o. in Mielec.
- 3.2. The Supplier is expected to offer a technological process line in conformity with specification determined in description of the Subject of Order, composed of brand new machines and devices, together with supplying it to and commissioning in location referred to in this Call for Offer. It shall be required to enclose a technical description allowing to assess unambiguously the conformity of the offered devices and their parameters with the specification.
- 3.3. Detailed description of the Subject of Order is given under subsection 3.5.
- 3.4. The Supplier shall be obliged to made himself acquainted with the technological process which will be implemented on the technological line to be supplied. Moreover:
- The Supplier shall guarantee supplies, installation, and configuration of all machines and devices listed in description of the process (see Attachment "Layout"). The tooling planned to installed on presses (press tool, side hole punching tool, piercing tool) and the shearing tool shall be provided by the Orderer.
  - The Supplier shall declare configuration of the control system for all supplied elements of the technological process line enabling to realize all operations according to description given in Attachment "Layout".
  - The Supplier shall have knowledge, experience, and potential necessary to supply the Subject of Order in a right and proper way.
  - As a precondition for taking part in the offer selection procedure, the Supplier shall present a list of at least 3 completed projects concerning supplies of technological lines — within the period not longer than 3 years before the date of submission of the offer within the present procedure. The technological line is considered to be at least a set of equipment consisting of a press and an industrial robot. The list should include: delivery date, recipient name, short technical description of the line.
  - The Supplier undertakes to keep secret the whole of confidential information received in the course of the present Call for Offers and in the course of realization of the supplies. Such information must not be disclosed to third parties.

**3.5. Technical specification of the technological line**

The technological line for deep drawing of large-dimension articles shall comprise:

- A hydraulic press — 1 pc.;
- A mechanical press — 1 pc.;
- A robotized transfer system — 1 set;
- An automated scrap reception and transport system — 1 set.

Detailed description of the Subject of Order:

**3.5.1. A hydraulic press with the following parameters:**

- a. Press slide capacity — 8000 kN at the minimum.
- b. Dimension when closed — 700 mm.
- c. Slide travel — 1000 mm at the minimum.
- d. Slide travel length controlled from the operator's panel.
- e. Slide working surface area — 1600 mm × 2600 mm at the minimum.
- f. T-slots in the slide symmetrical relative to the press table.
- g. Number of slide working cylinders — 2 at the minimum.
- h. Slide equipped with slide guides.

- i. Protection against gravitational drop of the slide (SITEMA or equivalent).
- j. The function of fast approach and retraction of the slide with the function of gentle braking before the preset position.
- k. Adjustable pressing speed at half of the rated capacity allowing to obtain the minimum speed of 35–38 mm/s.
- l. Adjustable pressing speed at the rated capacity allowing to obtain the minimum speed of 22–25 mm/s.
- m. Slide approach speed — 400 mm/s at the minimum.
- n. slide return speed — 600 mm/s at the minimum.
- o. Press table working surface area — 1600 mm × 2600 mm.
- p. Press table thickness — 290 mm at the minimum.
- q. The press table provided with 135 sleeved holes (bronze sleeves closed with steel caps) in the table for Ø50 mm H13 ejector pins arranged with the pitch of 150 mm × 150 mm to form a mesh symmetrical relative to symmetry axes of the table. T-slots 28 mm × 50 mm spaced by 300 mm and distributed symmetrically along the table length (for pictorial drawing — see Attachment No 8 ).
- r. Required cushion pressure force — 2000 kN.
- s. Number of working cylinders — 2 at the minimum.
- t. Cushion guides design — 4 columns with diameter of Ø120 mm as a minimum. Stiffness of the cushion should ensure that the maximum deflection will not exceed 0.15 mm at the rated slide and cushion load (with the simulated load applied to cushion by ejector pins placed in all outermost rows).
- u. Cushion travel in the press table — 400 mm at the minimum.
- v. Cushion surface area — 2200 mm × 1300 mm.
- w. Cushion travel length regulated from the operator's panel.
- x. Spring cushion equipped with hardened, removable, and replaceable cover plates with hardness 44HRC at the minimum in points of cushion-ejector pins contact.
- y. The used hydraulic drive systems as well as slide and cushion control systems must offer stepless regulation of pressing force and speed as functions of travel (representation of speed and force curves) within a single press stroke.
- z. Main pumps with variable output controlled by means of proportional valves.
- aa. H-type frame, with maximum dimension between outermost walls of columns 2700 mm (width) × 3800 mm (height). Press placement on the industrial floor level. The press table working surface maximum height over the floor — 1000 to 1200 mm (including vibration-insulating element).
- bb. Side window dimensions — 1600 mm (width) × 1100 mm (height) at the minimum.
- cc. The side window not used for die replacement must be protected with foldable or removable wire mesh guard.
- dd. Touch-screen operator's panel type with diagonal of 14 in. as a minimum.
- ee. The software must include a graphical user's interface with visualization of current press position, current force values, and force settings for all slides.
- ff. Force values measured by means of pressure transducers in the hydraulic system.
- gg. Proportional valves control exercised with the use of PWM method; it is inadmissible to use valves with control cards integrated in the valves. The proportional valves should be controlled and the actuation signals generated by the main PLC of the press.
- hh. Programming with the possibility to modify all press parameters in real time (pressure, operating speed, slide and cushion pressure force, defining speed/force curves for individual press operation cycles).
- ii. The press control system integrated with all devices listed in the cards "basic cycle 1" and "auxiliary cycle 3" of the attachment "Layout". Full access should be possible to



- edition of parameters and formulas defining automated cycles of operation of the press, the robots, the roller conveyor in the loading zone, and the belt conveyors.
- jj. The pressing time set from the operator's panel. The time of keeping slide pressure in the lower position adjustable in the range of at least 1–10 s.
  - kk. Memory to store at least 50 recipes.
  - ll. Press strokes counter on the operator's panel.
  - mm. Machine work time counter (defined as the main pumps operating time).
  - nn. Temperature oil control.
  - oo. 16/16 configurable digital inputs/outputs as functions of slide positions; configuration from the operator's panel (to be used, among other things, to monitor presence of material, pressing, and/or scrap, lubricating, feeding).
  - pp. Light curtains in front and at the back of the press, the safety system level conforming with PL e.
  - qq. Motors of main pumps supplied with the use of soft starters.
  - rr. Phase asymmetry transmitter (power supply), providing phase sequence recognition; Working with a delay of no more than 0.5 seconds. The status of the work is determined by LEDs
  - ss. Operator's panel mounted on a rotate & swivel arm in a place safe for the operating personnel.
  - tt. The press equipped with vibration-damping pads or shock absorbers.
  - uu. Automatic lubrication of moveable press components (slide and cushion guides) with oil recirculation and filtration.
  - vv. Oil cooler with fan and option to connect to a cooling water circuit.
  - ww. Hydraulic clamping of the die — 8 pcs. for slide, 8 pcs. for the press table; the required clamping force — 20 kN per piece at pressure of 250 bar.
  - xx. Hydraulic lifting of the die with the use of rollers or balls seated in replaceable T-section strips.
  - yy. A mobile die replacement system via the press side window: 2 guides (consoles) mounted on the press side, die sliding in and out with the use of a system driven by a geared motor; the system to be operated by a single operator, adopted to the maximum die weight of 8 tons. The required replacement length — 2500 mm. Console separation — from 600 mm to 700 mm.  
A single die replacement system should be delivered to serve the two presses. The press should be equipped with adapters (fastenings) for positioning the die replacement system.
  - zz. The tool replacement system remote control mounted close to the system's arms.
  - aaa. Direction of scrap and stamping reception via the main windows — front/back of the press.
  - bbb. Ladder and platform for maintenance-related purposes (location according to the drawing).
  - ccc. Inscriptions on machines as well as menus and commands on the operator's panel in Polish language.

### 3.5.2 A mechanical press with the following parameters:

- a. Press slide capacity — 5000 kN at the minimum.
- b. Slide travel — 500 mm.
- c. Slide position adjustment — 500 mm.
- d. Slide working surface area — 1500 mm × 2500 mm.
- e. Maximum open height — 1450 mm.
- f. T-slots in the slide symmetrical relative to the press table.
- g. The slide equipped with sliding bearing guides and pneumatic load-release cylinders.
- h. Press table working surface area — 1500 mm × 2500 mm. (for pictorial drawing — see Attachmnet No 9)
- i. Press table thickness — 240 to 245mm mm at the minimum.
- j. Press table provided with T-slots 28 mm × 50 mm spaced by 300 mm distributed symmetrically along the table length.
- k. H-type frame. with the maximum dimension between outside walls of columns 2700 mm (width) × 3850 mm (length). Maximum height of the work area of the press table from floor 1000 to 1200 mm [including the vibro-insulating element]
- l. Number of connecting rot (slide suspension points) — 4.
- m. Adjustable number of press strokes — from 10 to 20 per minute.
- n. Rated number of press strokes per minute — 12 (in continuous mode operation).
- o. The structure allowing to obtain pressing capacity of 2000 kN at height 200 mm above the bottom end center of press slide.
- p. Touch-screen operator's panel with diagonal of 14 in. as a minimum on a rotate & swivel arm.
- q. The software must include a graphical user's interface with visualization of current position of the press slide.
- r. The press control system integrated with all devices listed in the card "basic cycle 2" of the Attachmnet "Layout". Full access to edition of parameters and formulas defining automated cycles of operation of the press, the robots, and the belt conveyors.
- s. 16/16 configurable digital inputs/outputs as functions of slide positions; configuration from the operator's panel (to be used, among other things, to monitor presence of material, pressing, and/or scrap).
- t. Memory to store at least 50 recipes.
- u. Hydraulic overload protection (adjustable).
- v. Automatic lubrication of moveable press components (applies also to slide guides) with oil recirculation and filtration.
- w. Press strokes counter on the operator's panel.
- x. Machine working time counter (defined as the main pumps operating time)  
Resettable counter of the press step on the operator panel
- y. Light curtains in front and at the back of the press, the safety system level conforming with PL e.
- z. Operator's panel mounted on a rotate & swivel arm in a place safe for the operating personnel.
- aa. The press equipped with vibration-damping pads or shock absorbers.
- bb. Hydraulic clamping of the die — 8 pcs. for slide, 8 pcs. for the press table; the required clamping force — 20 kN per piece at pressure of 250 bar.
- cc. Hydraulic lifting of the die with the use of rollers or balls seated in replaceable T-section strips.
- dd. A mobile die replacement system via the press side window: 2 guides (consoles) mounted on catch on the press side; die loading and unloading by means of a system



driven by a geared motor. The system possible to be operated by a single operator, adapted to the maximum die weight of 8 tons. The required displacement length — 2500 mm. Consoles separation — from 600 mm to 700 mm.

A single die replacement system should be delivered to serve the two presses. The press should be equipped with adapters (fastenings) for positioning the die replacement system.

- ee. The die replacement system remote control or cassette mounted close to the system's arms.
- ff. Dimensions of the press side window — not less than 1600 mm (width) × 1100 mm (length).
- gg. The press positioned on the industrial floor level, without necessity to provide any pit or hollow in the ground. The press table working surface maximum height over the floor — 1050 mm (including the vibration-insulating element).
- hh. Direction of scrap and stamping reception via the main windows — front/back of the press.
- ii. Ladder and platform for maintenance-related purposes (location according to the drawing).
- jj. Inscriptions on machines as well as menus and commands on the operator's panel in Polish language.

### **3.5.3 A robotized in-process transfer system**

- a. Three industrial robots with rated lifting capacity in the range from 90 kg to 180 kg.
- b. The robot arms reach radius: adapt the reaching capacity of robots to serve technological process workstations according to tasks described in the Attachment "Layout", with the guaranteed lifting capacity of at least 50 kg at the arm working radius of 3400 mm.
- c. Each of the robots installed on around 700-mm high steel stand bolted to the floor. Height of the stand and the arm reach radius should follow from an analysis of the robot-press-stacking/loading area working space.
- d. Each of the robots equipped with two ejectors, compressed air pressure failure sensor, and independent vacuum sensors for each of the ejectors.
- e. Independent control cabinets and manual programming panels for each of the robots.
- f. Hazardous spaces must be protected by means of wire mesh fencing, supervised gates, and optoelectronic barriers. It is required that the production line barriers and protections were certified in accordance with the EU CE Mark Directives.
- g. The stampings stacking areas should be equipped with belt conveyors (3 pcs.) transporting finished articles beyond the hazardous zone. The belt conveyor length — (2400 ±150) mm. Conveyor width — 900–1000 mm at the minimum; carrying capacity — 30 kg; adjustable working height — from 700 mm to 1000 mm; belt conveyor speed — adjustable in the range from 10 m/min to 30 m/min. The transporting belt made of oil- and abrasion-resistant material.
- h. The belt conveyor #3 should be equipped additionally with a platform used for unique positioning of each pressings after the blanking operation to be picked up by a robot and placed on the side holes cutting tool in a predefined position (according to description in the Attachment "Layout"). The flattened surface of the pressing should be oriented towards the operator when loaded onto the platform. To position a pressing on the platform, the pressing outline should be used.
- i. Each of the belt conveyors should be equipped with a sensor detecting presence of pressings in the extreme end position resulting in stopping the conveyor. The overload and the unloading allowed status signaling should be provided.
- j. Each of the belt conveyors must be switchable between forward and reverse movement direction. On the operator's side, conveyors must be equipped with control

buttons. The blanks loading should be equipped with a driven roller conveyor working in the automated operation mode, divided into three zones: the loading zone, the middle buffer for picking blanks up from pallets, and the pallets reception zone. Once being loaded onto conveyor, a pallet with a stack of blanks will be conveyed to the (buffer) zone where blanks are picked up by a robot. Pallets will be loaded with stacks of blanks in the form of circles with diameter Ø1115 mm. The stack height — up to 400 mm. Once all circles are picked up from a pallet, the roller conveyor will start automatically and move another pallet with blanks to the blanks picking-up zone. At the same time, conveyor moves the empty pallet to the end zone, where the line operator takes it off using a pallet trolley. In the meantime, the operator places the pallet with blanks in the loading zone of the roller conveyor. The conveyor loading zone should allow to park 2 pallets loaded with blanks. The robot picks the blanks up from the buffer and transfers them to the blanks unique (coordinate-based) positioning station. Moving a blank from the buffer to the positioning seat, the robot measures the weight and thickness of each of the blank picked up (the superfluous blank detection system).

- k. The robot feeding blanks onto the die should be equipped with a lubrication system allowing to lubricate the die base plate. A water-soluble lubricant will be used for this purpose. The robot lubricates the die plate before picking a blank from the coordinate positioning station. After picking the blank from the coordinate positioning station, the robot places it in die bases and lubricates the upper surface of the blank.
- l. The Supplier shall equip the robots in grippers (pneumatic grippers are recommended) adapted to transport articles assigned to individual robots in the process description given in "Layout", each gripping system being equipped with continuous control of piece presence by means of a sensor.
- m. Each of the belt conveyors must be switchable between forward and reverse movement direction. On the operator's side, conveyors must be equipped with control buttons.

**The whole of the system must be integrated with the two presses of Sections 3.5.1 and 3.5.2 to enable realization of cycles specified in the Attachmnet "Layout".**

#### **3.5.4. A conveyor for receiving scrap from sheet metal pressing**

- a. The number of segments — 7 at the maximum. The layout and length of segments should be adopted to the whole length of the pit (see the attached drawing showing plan of the pit).
- b. Conveyor belt width — 1050–1100 mm. Conveyor structure width — 1400 mm at the maximum.
- c. Conveyor segment height — 450 mm at the maximum (measured with belt surface parallel to the floor surface).
- d. The drive should ensure a fluid motion of the belt.
- e. The belt made of slat modules with 2.5" made of abrasion-resistant steel with hardness of 250HB at the minimum. Module thickness —  $(1.5 \pm 0.15)$  mm. Joints between the modules should ensure conveyor tightness in case of transporting fine scrap with Ø6 mm and 1 mm thick. The maximum scrap dimensions — 900 mm × 200 mm. The maximum scrap weight — 5 kg.
- f. Drive — a three-phase asynchronous gear-motor. The total installed conveyor power — 10 kW at the maximum.
- g. Conveyor belt rated speed — 10 m/min., adjustable within the range 60–130% at the minimum (by means of a frequency converter). The conveyor equipped with emergency stop buttons. Option to select from at least three operation modes: mode 1



- for all conveyor segments; mode 2 and 3 — only segments indicated by the Orderer.
- h. Conveyor belt load capacity — 80 N/m<sup>2</sup> at the minimum.
- i. Belt design should ensure flawless reception and transport of scrap along the whole conveyor length.
- j. Segments equipped with side boards with height of 130 mm at the minimum.
- k. A rotating discharge chute with 3 working positions in automated operation mode and adjustable scrap stack height measurement. Adopted to scrap container with dimensions 6.5 m (length) × 2.5 m (width) × 1.75 m (height).
- l. A system for waste material transfer from tools to the chute will be provided by the Orderer.

### 3.6. Additional requirements

1. All the technical requirements concerning the Subject of Order should be considered the limiting ones which must be met by the proposed equipment. The offer should be accompanied by a description in support of full and unambiguous conformity of the offered devices and their parameters with requirements set out by the Orderer in the technical specification under subsection 3.5.
2. The Subject of Order must be delivered to the Orderer's site.
3. The Supplier shall be obliged to supply a brand new machines and equipment. The Orderer shall not accept the possibility of supplying machines displayed earlier on exhibitions or fairs.
4. The supplier is obliged to deliver the Declaration of Conformity to the entire technological line and mark it with the CE mark
5. The line will be considered commissioned when a positive result of tests of the technological process carried out with the use of the Subject of Order is obtained, with the use of all installed machines and devices of the technological process line and the set of tool provided by the Orderer, according to the functional description included in the Attachmnet "Layout" and technical conditions given under subsection 4.5.
6. The acceptance protocol will be signed only after completion of technological tests with positive result and delivery of complete technical documentation, the declaration of conformity and other documents required by relevant laws (if such requirements apply in the territory of the Republic of Poland) for the whole of the Subject of Offer.
7. The execution of the order is unequivocal with signing the acceptance protocol and carrying out the necessary training without Purchaser's attention. This protocol will be the basis for issuing the final invoice.
8. Technical documentation of machines should be made in Polish language and include at least:
  - a. A plot of the effective work for single stroke in either single cycle and automated operation mode (applies to the mechanical press).
  - b. A plot of the allowable pressing force versus slide travel (applies to the mechanical press).
  - c. Engineering drawings of components of the presses developed in CAD environment programming (2D or 3D), delivered on a CD or a USB flash drive.
  - d. Documentation of electric, kinematic, and hydraulic systems.
  - e. List of electrical and mechanical spare parts.
  - f. Operating documentation and operating instructions
  - g. Copies of machine controllers software.

Other documentation items not listed above may be made in English language.

9. At the location of supplies, the Orderer will make available the necessary media and access to the assembly site from Mondays to Saturdays, from 7 a.m. to 11 p.m.

10. In return for realization of the Subject of Order, the Orderer shall pay the Supplier a remuneration in the following installments: 30% (preliminary advance payment), 50% (after declaration of readiness for shipment), 20% (after commissioning and signing the acceptance protocol).
11. The Supplier shall pay the advance payments after the Supplier establishing and presenting a security for right and proper fulfillment of his obligations following from this Call for Offers in the following form:
  - a. For the period from the supply agreement signature date to 30 days after completion of the supply and commissioning, the Supplier shall establish a security in the form of a blank promissory note provided with a clause "non-negotiable" with a notarially certified signature accompanied by a promissory note declaration.
12. The Supplier shall be obliged to offer training to operators of the technological process line installed on the Orderer's site.
13. The Subject of Order must be labeled in a way making possible to identify both the machine/device and the manufacturer.
14. All details of the Order comprising requirements of this Call for Offers shall be set out in an agreement concluded by and between the Orderer and the Supplier after selection of the latter. This Call for Offers does not constitute an offer in the meaning of the Civil Code and does not oblige the Orderer to enter into any agreement.

**„Firma TARAPATA” Sp. z o.o.**  
ul. Wojska Polskiego 3, 39-300 Mielec  
tel. +48 17 788 15 15, fax +48 17 788 15 16  
www.tarapata.com, e-mail: board@tarapata.com.  
NIP PL 817-18-63-002 REGON 891206184

PREZES ZARZĄDU

  
mgr Regina Wiech