

THE PRONAR MRW 2.85 PART OF A MODERN SORTING LINE

PP. 30-33

SALE ON ALL CONTINENTS

PP. 12-13

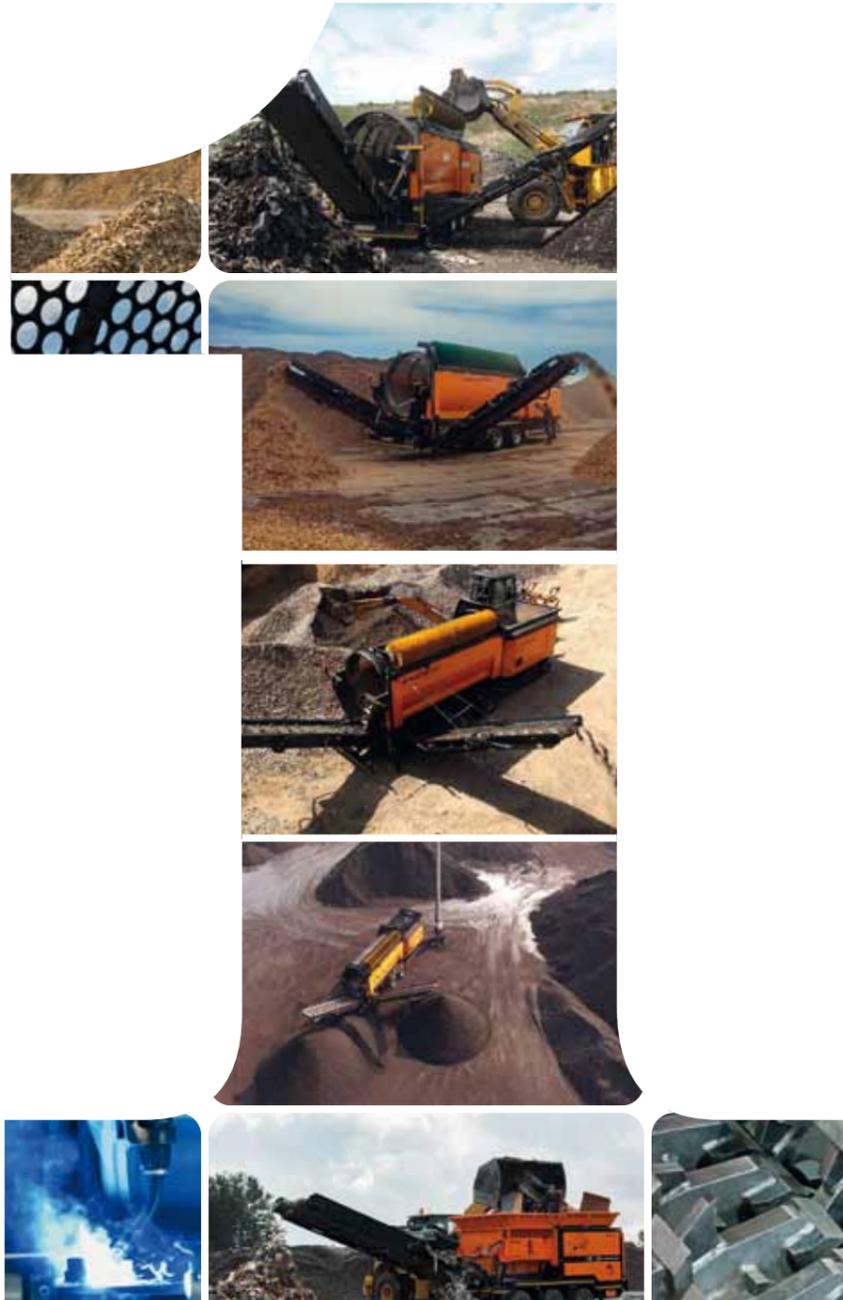
TRAILERS

PP. 46-58

MUNICIPAL MACHINERY
- COMPREHENSIVE OFFER

PP. 34-44





AHEAD OF OUR COMPETITORS!

www.pronar-recycling.com

Trade fairs and exhibitions are important tests of a company's achievements. This is why I often visit events at which Pronar is exhibiting its products. For example, last November I was at the Agritechnica in Hanover. Exhibitors from all around the world were presenting, among other things, agricultural machinery and equipment. The number of stands and guests made my head spin. Visitors could find products for agricultural farms of different sizes, and equipment of various classes and prices. At this point, obviously, I would like to wholeheartedly thank all of the Agritechnica's organisers for a wonderful and interesting exhibition.

Due to the great interest in the event, we couldn't have such a large stand as we would have liked to. But in Hanover, we presented a wide range of agricultural machinery (hook lift trailers, forage wagons and bale transportation trailers), wheels, axles and sideboards for trailers, as well as some of our Pneumatics and Hydraulics Department products (including telescopic single- and double-acting actuators and compressed-air reservoirs). I experienced the reactions of guests visiting the Pronar stand with great satisfaction, including those of our competitors, who were full of appreciation for Pronar's technological level and product quality. All of these opinions confirm the high position of the Company in many fields, including in the production of wheels for agricultural and building machines (third in the world), and trailers (fifth by number of newly-registered trailers in Germany).

I met similar reactions from visitors to our stand at the Bauma International Trade Fair for Construction Machinery, in Munich. Among the many machines presented were also Pronar products, including its mobile drum screeners.

We also like to participate in the large international trade fairs because we're directing an increasing part of our production toward foreign markets. Every market has its own specificities to which we adapt our products. We note the differences in agricultural and organizational philosophies between different countries, and adjust our agricultural machinery products to suit them. This is also true of our other products, such as the drum screeners, which can be used among other things, to screen earth, remove debris from it and enrich a horticultural base with the processed earth.

We respond quickly to the needs of individual markets. We're also constantly improving our machines and introducing new innovations. We understand that further investment is always necessary to keep pace with the needs of the market, so last year we built a Research and Development Centre, and this year we will complete the construction of our new production halls, expanding our total production area by 25,000 m².

So when we return to Munich, this time to the IFAT International Trade Fair for Environmental Protection (30th May to the 3rd of June), we'll be confident of presenting modern, innovative and functional products, all of which will be most welcome.

Sergiusz Martyniuk
Chairman of the Board, Pronar



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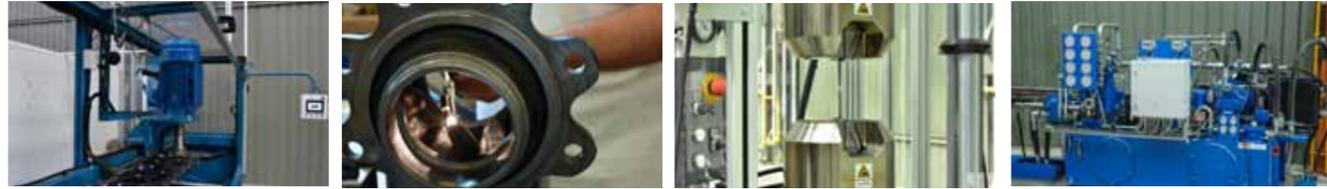
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NEWS

PRONAR



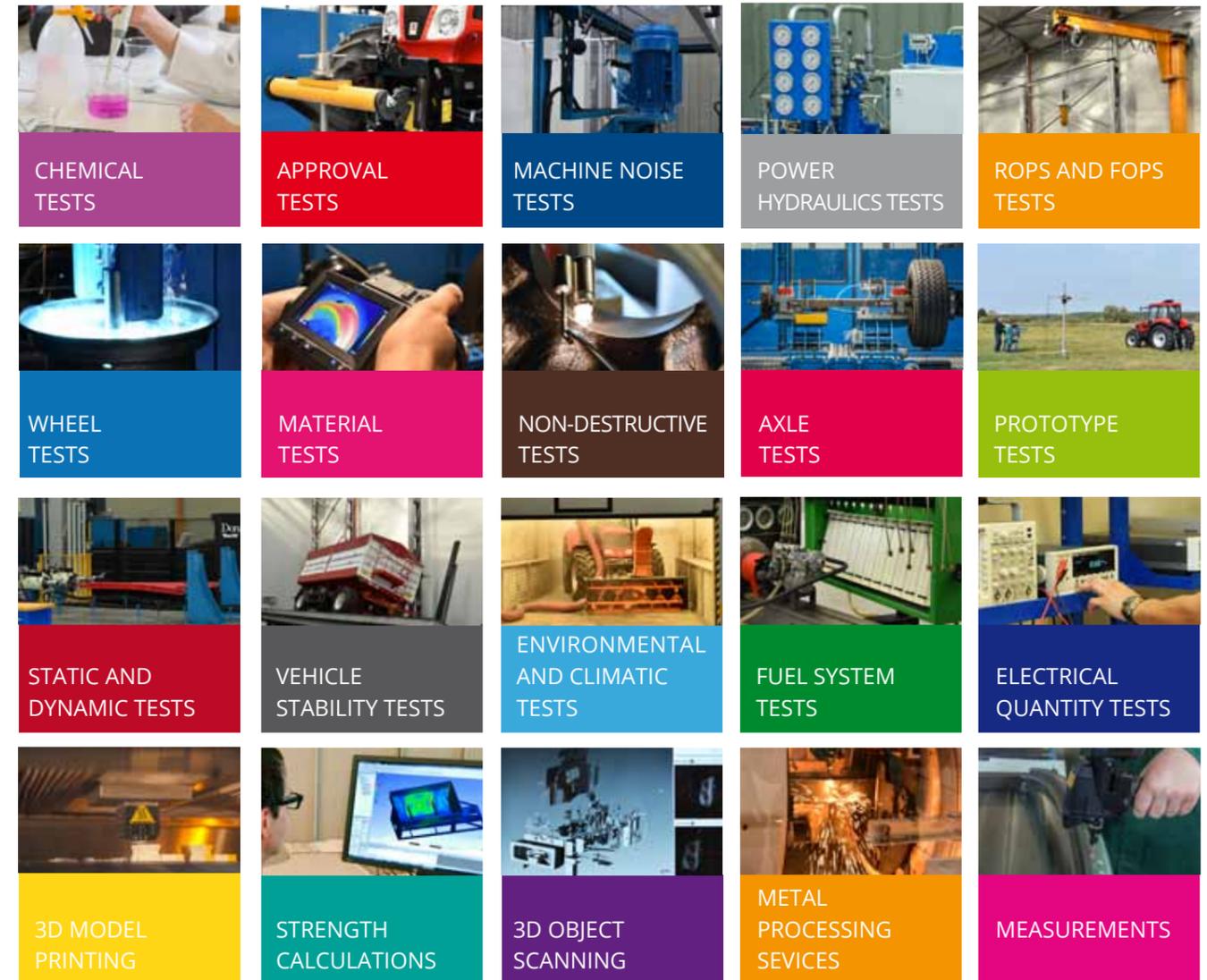
PRONAR RESEARCH AND DEVELOPMENT CENTRE

The RDC runs innovative and complementary testing for comprehensive research on crucial parameters of agricultural, forestry and building machinery, automotive vehicles and subassemblies. The RDC provides complete testing of specific products, all in one location, reducing test times and costs. The RDC performs specialist testing using state-of-art machinery with unique test equipment, measuring instruments and computer programmes that foster innovation and shorten the preparation time for bringing products into production.



Pronar's Research and Development Centre tests:

- Actuators,
- Engines, pumps, distributors of hydraulic pumps,
- Hydraulic line strength (DIN/ISO 6802, DIN/ISO 6803, ISO 8032),
- Loaders and hydraulically driven machinery,
- Load capacity of three-point suspensions and power systems of external hydraulics,
- Static protective constructions (CODE 4, CODE 6, CODE 7), hitches and safety devices (R 58 UN ECE),
- Dynamic strength,
- Axle fatigue resistance,
- In-service axles (inert machinery) R 13 UN ECE,
- The impact of welding strain and deformation on axial and radial run-out of wheels and other wheeled-symmetrical assemblies,
- Optimisation of the plastic working parameters of sheet metal in new products (press technology),
- Temperature distribution (thermography),
- Simulation of wheel rim coiling,
- Development of fail-safe technology (non-destructive testing) for disc wheels,
- Diagnosis of prototypes (hydraulic and braking systems),
- Material and joint defects in chambers, using X-rays,
- Material defects, using ultrasonic methods,
- Vehicles and machines in a thermal chamber,
- Electromagnetic compatibility of vehicles and machines,
- ROPS (Roll Over Protective Structures) and FOPS (Falling Object Protective Structures),
- Stability of vehicles (amongst others, R111 UN ECE),
- Fuel systems,
- Plastics of plastics (ISO 1133, PN-EN ISO 1183-1:2013-06 A),
- Electrical quantities,
- Electromagnetic compatibility (R 10 UN ECE),
- Machinery noise (ISO 3744),
- Objects in a salted atmosphere chamber (ISO 9227, ISO 6270),
- Objects in a UV chamber (ISO 16474-2, ISO 4892-2),
- Paint (ISO 2409, ISO 2808, ISO 2812-1,2, ISO 6860, ISO 15184).



The RDC is fitted with:

- A 3D printer, for production of plastic objects based on 3D modelling, for verification of functional features,
- A 3D scanner, for fast verification of prototypes,
- Computing stands, for checking of stress, deformation and transfer distributions of designed objects using FEM (Finite Element Method),
- A 3D laser, for threading and cutting of different types of lines (round, square, rectangular) and steel profiles (T, 2T, H, C, I and L) with very high precision.

The high quality of the RDC's work is ensured by:

- Experienced, qualified, professional staff,
- Modern, innovative machinery,
- The accuracy, precision, repeatability and reproducibility of its measurements and research methods,
- Short waiting times for performance of research services,
- Service quality at the highest international levels.





Airport

BRINGING THE WORLD CLOSER TO NAREW



Rapid development and the real fight for competitiveness on the market require increasing flexibility and ease of concluding contacts with exhibitors and potential customers. Therefore, Pronar – an active manufacturer of agricultural and municipal machinery and a vital player in its global sector – has embraced a modern, fast and comfortable form of communication.

In the age of easy Internet communication, and considering the possibilities offered by the Internet itself, direct contact between interested parties is a decisive factor in the conclusion of further commercial contracts. So to shorten the time ne-

eded for direct contact with contracting parties, and to allow them to reach Pronar's head office quickly and comfortably, in the autumn of 2015 the Management Board decided to build an airplane runway on the land directly adjacent to Plant No. 2 in Narew.

A helicopter landing area had already been operating there since the early summer of 2015. Now, both the airplane and helicopter landing areas meet the legal and functional requirements of all flight operations, and have been entered in the Polish and international landing area registers. Fulfilment of all of the requirements for compliance with the technical criteria for airfields, as specified in international standards, is a satisfying conclusion for the Company as well as a testa-

ment to the extent of the work, effort and resources poured into the entire investment.

The 'NAREW' helicopter landing area and 'NAREW-2' runway have their own lighting for safe operation at night. And in accordance with the Management Board's decision, they are also accessible to state aviation (the police, military and emergency and services, etc) as well as to other users. The city of Narew is located in a geographically and environmentally attractive place near Białowieża Forest in Podlasie, in the northeast of the country. It attracts many tourists from Poland and abroad travelling by light aircraft and helicopters to the region. Tourists to the region often include businessmen and women, whose decisions can affect the fu-

ture development of the entire region.

Both of Pronar's investments work to the benefit of the local community and the continuous economic development of Pronar and Podlasie.

Helena Landowska
Marketing Specialist at Pronar

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This year, sale by Pronar of Jet A-1 aviation fuel, with excise, begun. Aviation fuel is available on working days from 8 am to 3 pm, following agreement and confirmation at least 24 hours in advance.



Investments

BUILDING AND EXPANDING PRONAR'S FACTORIES

In Poland, Pronar has a market share of almost 50%, having outdistanced the other home-market players a long time ago. With its increasing production capabilities, innovative technologies, modern production lines and experienced workforce, as well as construction and design personnel, Pronar's many models and highly specialized services can also be sold on foreign markets. Pronar is manufacturing more and more machines, and implementing subsequent elements of its development strategy, which includes the opening of more factories and significant expansion of existing plants.

One new factory is being built in Hajnówka (in the Podlaskie Voivodeship, north-east Poland) over an area of more than 90,000 square meters. The capacity of the production halls, now already finished, amounts to 193,200 cubic meters, and cover an area of 16,100 square meters. The new facility will allow new production lines to be launched. Axles, gears, chassis and transmission systems will be manufactured there.

The existing plant in Narewka (also in the Podlaskie Voivodeship) is being expanded with new produc-

tion halls. After the expansion, the area of the plant will nearly double from its current 14,600 square meters to 26,900 square meters. This will not only increase the number of machines manufactured there (production of three models of hook lift trailer has already been moved there), but will also enable the assembly of individual groups of trailers to be separated. This will contribute to shorter order completion times.

The growing demand by public utility departments for machinery and equipment prompted construc-

tion of another factory – the Municipal Machinery Production Plant, in Siemiatycze, in 2011. With the rapidly growing need for large-scale recycling machines, the decision was made to increase the area of this factory by a further 21,000 square meters. The expanded plant mainly manufactures components for recycling machinery with a mass of up to 40 tonnes. It covers an area of 138,000 square meters, and the halls have a total capacity of 205,000 cubic meters and take up around 28,000 square meters.

These investments also contribute to employment. Pronar is one of the biggest employers in the north-east of Poland, and actively participates in the vocational stimulation of local residents. The company not only provides job opportunities, but also possibilities for earning new professional qualifications as well. Pronar's factories provide jobs for many young people, for whom these are their first jobs.

With the launch of the new factory and expansion of two existing plants, more local people will be acquiring a stable employer and several hundred jobs.

Helena Landowska
Marketing Specialist at Pronar



Narewka



Siemiatycze



Hajnówka

Pronar on foreign markets

SALE ON ALL CONTINENTS

Investments in new technologies, a wide range of products and care for the quality of its products and customer service have made Pronar one of the largest and fastest-growing Polish companies. The Pronar logo is recognised not only in Poland, but abroad as well.

Pronar is not only the largest manufacturer of agricultural and municipal machinery in Poland, it is also a renowned producer on foreign markets too. It is sufficient to mention that, according to the German institution KBA, Pronar is in the top five companies whose agricultural trailers are most frequently registered in Germany. The company's products meet European standards and qualitative requirements, as confirmed by relevant certificates, and enjoy great popularity among farmers in Poland and abroad. "In Poland, there is nobody to compete with. We want our machinery to conquer the world," said Sergiusz Martyniuk, President of the Pronar Owners' Council, on the company's expansion plans.

Many renowned international firms also work with Pronar. One example is the latest contract with Mercedes, with which Pronar has developed, among other things, a multifunctional semitrailer and a range of accessories for the newest Mercedes Unimog.

Pronar's share of individual trailer sales in many countries reached about 50% last year. This covers, for example, hook lift trailers in Norway, and load-handling wagons in Ireland.

Swiss users have taken a special liking to hook lift trailers with containers, the T683 and T663/4 Tandem drop-side trailers as well as our 12-tonne capacity bale transporta-

tion trailers. PRONAR municipal machines are also very popular in Switzerland, where our wide snowploughs and snowblowers have been operating on the roads in winter for several years now.

Despite strong competition, Pronar is also well-known on the Austrian market, to which the company exports various types of trailers. In Austria, in addition to hook lift trailers and drop-side trailers adjusted to pallet transport (the T680 and PT series), there is great demand for animal transportation trailers (the T046 and T046/1). And in recent years, more and more Austrians have also been purchasing the PRONAR RC2100 and PRONAR RC2100/2 load-bed trailers, for carriage of heavy machinery. From our bale transportation trailer line, the T022, T024 and T025, with Tandem chassis and total laden weight of up to 12 tonnes, are most favoured.

From among the foreign markets, Pronar records the highest level of sales in Germany, and the dynamics of the trade volume with our German partners grows every year. In 2015, Pronar was the only company outside Germany among the top five manufacturers of trailers, in terms of their registration there. Pronar's trailers are most often chosen by farmers from Bavaria, North Rhine-Westphalia, Baden-Württemberg and Schleswig-Holstein. Many types of PRONAR trailers are widely popular, and the most frequently sold models in-

clude the 18-tonne double- and triple-axle bale transportation trailers and hook lift trailers. Pronar offers several types of 18-tonne double-axle trailers, including the T680, T680U, T680H, T680P. Each is used for different purposes in different regions of Germany. Of all of them, the PRONAR T680, upgraded last year, is the best-selling model. In its case, the favourable price-to-quality ratio is the decisive factor for our German buyers. The 'U' version is equipped with a system of rubber seals in the seats at the floor plate, which is very useful, especially in the transport of rape. The T680H – which is particularly popular in the east German 'länder' – is fitted with hydraulically-raised sidewalls, while the T680 is also available in a version with plywood walls, the T680P.

For years, there has also been a demand for Pronar bale transportation trailers in Germany, Austria and Switzerland. Pronar offers trailers with different load capacities and various accessories fitted as standard. The bale transportation trailers (maximum laden mass of 12-18 tonnes) are manufactured in two versions: Standard and Modernised (M). The M version is fitted with a 4 mm-thick reinforced sheet-metal floor with one weld seam along the bed. Its edges are rounded, which prevents the foil on the bales from snagging and tearing. In 2015, Pronar introduced two new models of bale transportation trailers for these markets, the

T025KM and T026KM, which can be fitted with stanchions for transporting timber. And in 2016, Pronar began production of the T028KM bale transportation trailer, with hydraulically-raised side walls that more effectively secure loads.

Pronar's wheels, which are fitted to building, industrial, forestry and military machinery, also enjoy wide market recognition in other countries. These are manufactured using unique cold-working technology, in a process employed by just three other companies in the world.

The high quality of the wheels' rims, confirmed by various certificates, has attracted the interest of the largest global tyre manufacturers, including Michelin, which chose to work closely with Pronar as a strategic partner. Pronar was issued a prestigious certificate by SGS (the world's leading inspection, verification, testing and certification company), for the high quality of its wheels. The certificate, granted as a result of an audit conducted for Michelin, proved that Pronar's manufacturing processes meet the highest qu-

ality standards, and allow it to compete with the best players in its sector.

Over the years, Pronar has established itself as a highly-regarded, positively-recognised brand and has gained an opinion as a reliable manufacturer. The machines from Poland are delivered to European and former Soviet Union countries, as well as to customers in Africa, Asia, both Americas and Australia.

Helena Landowska
Marketing Specialist in Pronar



AGRITECHNICA IN HANOVER

From November the 8th to the 14th in Hanover (Germany), thousands of producers in the agricultural sector met hundreds of thousands of potential customers, all in a single place. This year's Agritechnica Exhibition was themed around 'Man-Technology-Innovation'. Pronar was there, and had a lot to boast about, presenting its latest manufactured trailers, machinery and equipment at two stands.

Pronar's stands attracted visitors not only with their style, but mostly with the machines on display. The manufacturer from Narew (in the Podlaskie Voivodeship, north-east Poland) mainly showed new products, including trailers. Visitors also saw the latest model of hook lift trailer, the PRONAR T386. This is the first Pronar hook lift trailer on a Tridem suspension. Another Pronar trailer that was of great interest to the public was the T400R forage wagon, with a rotor and a load capacity of 13.2 tonnes.

Furthermore, the company presented its latest model of bale trailer, the PRONAR T028KM, which has hydraulically-lifted side walls to protect the transported load. This versa-



tile product, designed primarily for transporting bales of straw or hay, etc, can also load onto pallets or in pallet-boxes, and is used in agriculture and forestry.

Representatives of the Pronar Side Wall Profile Department gave a presentation on the trailer's side walls. Visitors to the Pronar stands welcomed the quality of the laser welding, which in comparison with conventional welding is characterised by exceptional tightness. The visitors also had the opportunity to become acquaint-

ted with the cylinders and compressed-air reservoirs used in Pronar machines, and that are also delivered to a wide range of external customers. The single- and double-action telescopic cylinders attracted special interest.

PRONAR Multi-fit Wheels (PMW) are universal bolted wheels, and proved the hit of this year's Agritechnica when they were shown at a separate stand run by the Pronar Wheels Department. A presentation designed for trade fairs that consists in immersing the wheels in an aquarium filled with a solution aggressive to paint, allowed for demonstration of the great effect of the wheel-painting technology used by Pronar.

Agritechnica supplied Pronar with an opportunity to hold many serious business talks with current and potential business partners, while participation in the fair also had an impact on the growing recognition of the PRONAR brand on foreign markets.

Łukasz Leśniak
Deputy Marketing and Trade Director at Pronar



COMPOST 2016 CONFERENCE

From January the 25th-28th in Jacksonville, Florida, the world's largest composting conference took place. COMPOST 2016 provided an excellent platform for over 900 participants from around the world to exchange their experiences of the utility, energy and use of bio-waste in producing high-quality compost.

A machinery exhibition was an integral part of the conference, at which participants could view many new technical products. The Pronar stand enjoyed great interest, and was visited by both compost manufacturing experts and specialist recycling equipment dealers. The 3D models of Pronar recycling machinery attracted great attention, and interest in Pronar's products and favourable reviews of its design technologies resulted in several new commercial contacts. hi





AWARDS IN BUDAPEST

The biggest agricultural trade fairs in Hungary – the AgromashExpo and the AgragepShow – took place at the Hungexpo Exhibition Centre in Budapest at the end of January. Visitors had the opportunity to become acquainted with various modern agricultural machines.

A wide range of services to the farming sector was also presented. The exhibitors' stands covered 35,000 square meters, with 1,000 square meters belonging to Pronar's Hungarian representative, who presented, among other things, trailers and green forage machines from Narew. Visitors also saw the T700, T680, and T672/1 trailers, the N262/1 ma-

nure spreader, Z500 round baler, ZKP350 and PDK220 mowers, LC3 front loader and PU-T20 and PU2100 snow scrapers.

The competition jury at this year's event awarded the new PRONAR T028KM – a bale trailer with hydraulic side walls – for construction innovation. The new design of the modernised Z500U round baler also attracted visitors' attention.

However, the N262/1 manure spreader, which made a good impression on all of the visitors with its huge dimensions, enjoyed the greatest interest. The N262/1 has the potential to become one of the better-selling Pronar products in Hungary. (kt)

EXPO MELILLA – PRONAR IN URUGUAY

Melilla Expo is a agricultural fair designed for professionals. Every year, dynamic presentations, new technologies in the field of livestock farming and milk processing attract hundreds of farmers to Montevideo in Uruguay.

The aim of the exhibition is to show farmers all the machinery and equipment that appear on the market which can improve farming productivity, profitability and bring profit. Such a large agri fair Pronar could not miss. Our Uruguayan dealer once again exhibited our equipment. A new brand on the market aroused particular interest of visitors and the media industry.

Expo Melilla in numbers:

- more than 400 hectares of field intended for machinery demonstration
- more than 20 hectares prepared for a demonstration of irrigation systems
- Over 50 dynamic shows a day on 70 ha
- more than 200 exhibitors
- more than 1000 brands
- more than 550 cattle and animal exhibitions.



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TRACTORS

PRONAR 5440 Tractor

MEETING EVEN FUTURE STANDARDS

In compliance with Stage IIIB requirements and EU regulations in force in 2016, PRONAR 5340 tractors can continue to be marketed. So the PRONAR 5340 will continue to be part of the Company's range for the time being. However, Pronar has already developed a prototype tractor that complies with Stage IV requirements. This is the PRONAR 5440, which is undergoing bench, field and type-approval testing. It will become the next in the P5 series – a successor to the 5340 – and is a response by Pronar's designers to the next European Union regulations on exhaust emissions, binding at Stage IV.

The Pronar 5440 will be driven, like the older model, by a 106 hp Deutz TCD3.6 L4 engine with maximum power of 106 hp. The Deutz engines have been used for several years now in tractors and agricultural machines, and are well known and valued for their operational features, reliability, durability and low fuel consumption. The TCD3.6 L4 is a turbo unit with an intercooler, com-

mon rail-type fuel injection, externally-cooled exhaust gas recirculation (EGR), and a diesel oxidation catalytic converter (DOC).

The next generation of catalytic converter is used in these engines to reduce the output of hazardous nitrogen oxides in the form of atmospheric nitrogen (N₂) and water. This process is called selective catalytic reduction (SCR), and requires the

use of an aqueous solution of AdBlue urea, which is stored in a separate tank and injected into the exhaust system. The catalytic converter is located in the front of the cab next to the right support post, and does not reduce the operator's visibility.

As in the previous model, a diesel oxidation catalytic converter (DOC) without DPF will continue to be used. This is an open catalytic co-



Did you know...



The first tractor in the world was built in **1868**, the machine was powered by a steam engine. The first tractor with a petrol engine was not manufactured until **1889**.

verter, therefore it cannot be blocked and does not require a cleaning cycle, as in DPF systems (in which the diesel particulate filters have a closed structure). The diesel oxidation catalytic converter is absolutely maintenance-free, and has an operating lifetime as long as the engine's.

Because the engine is designed to meet future standards by adding further after-market modules, the manufacturer has declared that it is ready for Stage V requirements, which the European Union will bring into force in 2020. But what does that mean for the tractor's users? All they'll need to do is add the AdBlue so-

lution to an additional tank. This second tank has a large capacity (approx. 20 dm³), and is expected to need to be filled with every second fuel filling. Both the tank and the pipes are equipped with heating systems, which allows the urea to be quickly thawed out (urea solution freezes at -11°C). The AdBlue tank is integrated into the main fuel tank in such a way that both fillers are located next to each other.

The drive train of the Pronar 5440 (gearbox and rear axle) remain unchanged from the previous model. These are still ZF products, and ZF is a German leader in the production of

drive trains for agricultural machinery, trucks, passenger cars and buses. The Powershift system, mounted as standard, allows gear shifting under loads without actuating the clutch.

Four standard power take-off driveshaft working ranges (540 rpm and 1000 rpm, and the so-called economical speeds of 430 rpm and 750 rpm) make as efficient use of available engine power as possible. The wet multi-disc brakes ensure high performance and resistance to overheating.

The hydraulics system in the new model has a three-point linkage and is one of the main assets of this



tractor series. Standard models already have an electrohydraulic control system for rear three-point linkage, and a new system with increased functionality is now undergoing testing. Users will have on hand, amongst other things, a display and programmable settings for the most frequently used machines, which can be quickly selected from a menu. With the high loading capacity of the rear

three-point linkage (max. 4,900 kg; over the entire range 4,200 kg) even the heaviest machines working with a tractor of this power can be aggregated. The new tractor also enables the user to control the three-point linkage from outside, with a set of push-buttons located on the rear mudguards. The links are provided with hook-type holders as standard, which makes machinery aggregation easier.



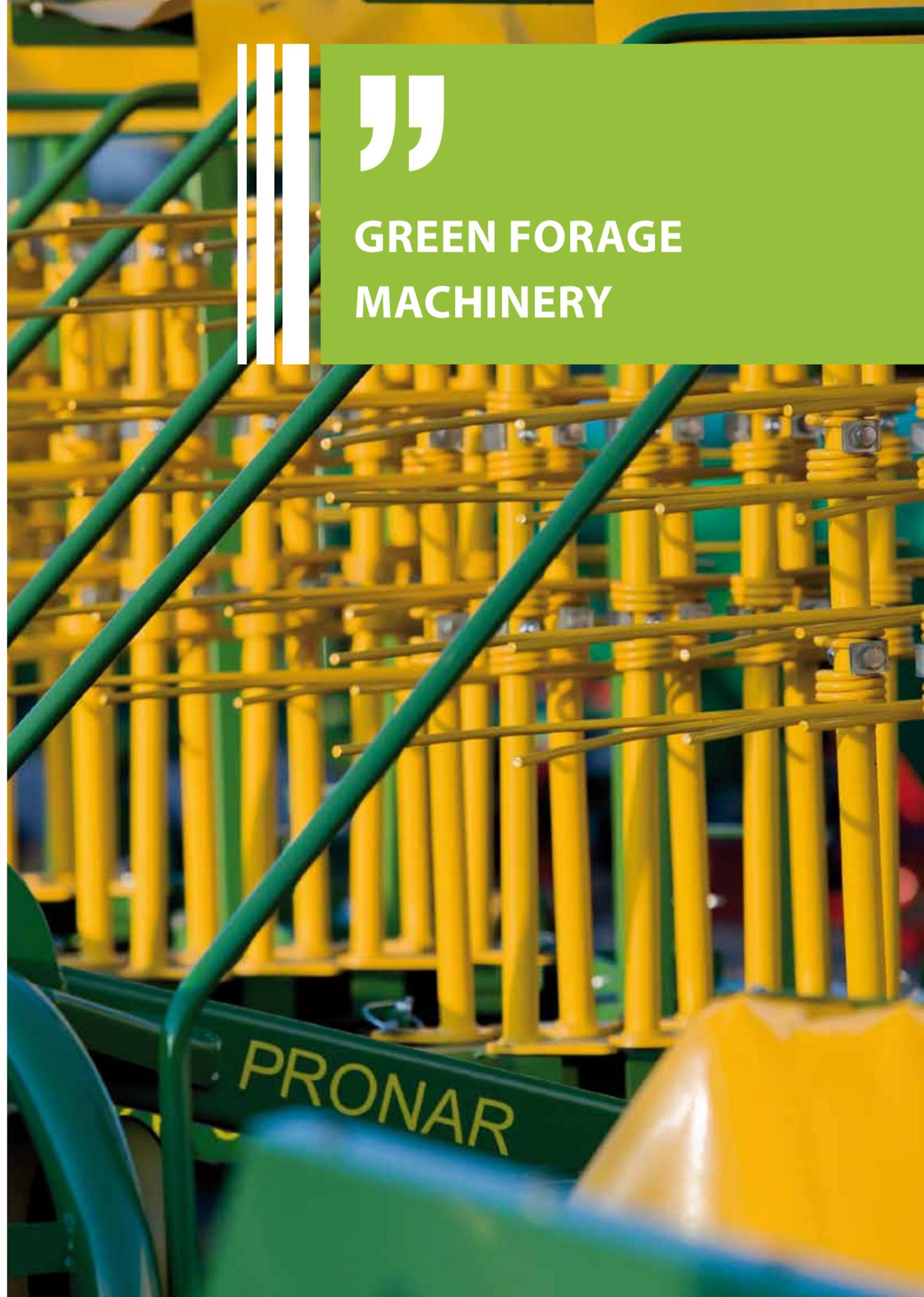
The tractor cab has also been slightly modified. An integrated control panel brings the work lamps and flash lamp together, instead of the previous arrangement of separate key switches. Additionally, the external and internal temperature is displayed on the panel. The roof has also been reshaped and widened. The work lamps have been changed from elliptical lamps to round ones, with LED (light-emitting diodes) light sources, which considerably reduce power consumption.

Accessories include a rear tractor tool camera overview system and media player. Signals from both devices can be presented on a common, colour, adjustable display.

With its excellent performance, technologically-advanced engine and gearbox, as well as its functionality, the new P5 PRONAR 5440 tractors will meet even the highest user requirements.

Robert Woldański
Pronar Regional Sales Representative

GREEN FORAGE MACHINERY



Green forage machinery

COMPLETE LINE

Pronar manufactures complete lines of equipment for green forage harvesting and management. This includes mowers, rotary tedders, rotary rakes, round balers and bale wrappers. A suite of these machines ensures comprehensive management of grassland, such as pastures, through grass mowing, drying, raking, baling and finally wrapping in foil. The line can be extended with bale transportation trailers and mixer feeders.

The assortment of disc mowers manufactured by Pronar comprises both rear-mounted disc mowers (the PDK220) and front-mounted disc mowers (PDT260, PDT260C, PDT300, PDT300C and PDT340). Both types of disc mowers are provided with a central suspension, which ensures excellent ground tracking, clean, aesthetic cutting and optimum cutting height. Another advantage of this design is the adjustability of the cutter bar's pressure on the ground, by surface type: from soft and peat soil, to hard and dry soil. This works through adjustment of the stay springs. Furthermore, operation of the mowers on uneven ground is facilitated by extensive an inclination range (-16° ÷ +11°). The PRONAR PDT260C and PDT300C mowers are additionally equipped with a swath conditioner, which breaks down the mowed material and abrades its natural waxy layer, significantly accelerating the drying process.

The PRONAR PDF300 and PRONAR PDF390 front-mounted disc mowers are manufactured using the most innovative technologies and with high-quality materials. These are modern machines with very good operational parameters and versatile functionality, characterised by a modern design that is compact, solid and light, with a large ground tracking

range (510 mm; from working position: up – 270 mm; down - 240 mm).

The PDD830 has the largest working width of all the Pronar disc mowers. It is an excellent choice for farmers handling large areas of grassland, and can also be an alternative to expensive self-propelled mowers. The PRONAR PDD830 consists of two cutter bars (each with a working width of 3 m) mounted on a single frame. The cutting width of 8.3 m is achieved by a front-mounted disc mower with a working width of at least 2.9 m. All mowers in this line are transportable after the folding, by means of hydraulics, of the rear cutter bars into a vertical position. The hydraulic guard system protects the cutting unit against damage by rising and tilting it back in case of contact with obstacles.

Pronar manufactures two models of rotary tedders:

- PRONAR PWP530 (weight 685 kg) – four rotors with a working width of 5.3 m. Power requirement ranges from 30 HP (22 kW);
- PRONAR PWP770 (weight 915 kg) – six rotors with a working width of 7.7 m. Power requirement ranges from 60 HP (44 kW).

Both models of rotary tedders are characterised by high reliability

and effectiveness. Other Pronar machines in the green forage harvesting line include rotary rakes. Pronar manufactures two types of rotary rakes:

Single-rotor rakes

- PRONAR ZKP300 (weight 285 kg) – eight working arms with a working width of 3 m and three double raking fingers on each arm. The rotary rake, mounted on a rigid suspension with an axle system, is equipped with two wheels with pneumatic tires and is designed for use with tractors of 20 HP (15 kW) upwards.
- PRONAR ZKP350 (weight 315 kg) – nine working arms with a working width of 3.5 m. The rotary rake, mounted on a rigid suspension with an axle system, is equipped with two wheels with pneumatic tires and is designed for use with tractors of 25 HP (19 kW) upwards.
- PRONAR ZKP420 (weight 500 kg) – eleven working arms with a working width of 4.2 m and four double raking fingers on each arm. The rotary rake is mounted on an elastic suspension, equipped with mobile heads (to improve manoeuvrability and ground tracking) and two shock absorbers (to improve working conditions). The axle system is equipped with four wheels with pneumatic tires in a tandem arrangement. The machine is designed for use with tractors of 30 HP (22 kW) upwards.

Double-rotor rakes:

- PRONAR ZKP800 (weight 1940 kg) – two rotary rakes with a working width of 3.1 m, mounted on a common

bearing frame. The rotary rakes turn counter-clockwise, which allows the raked material to be arranged in a single, centrally formed roll. The rotors of the rotary rakes are provided with their own tandem axle system and coupled by bearing arms with a cross-articulated system. This suspension ensures very good ground tracking, even under difficult working conditions (for example, steep inclinations or uneven surfaces). More information on the ZKP800 can be found in the article on page 26.

The round baler is part of a group of machines that are necessary for good preparation of fodder. The PRONAR Z500K is a modern and efficient fixed-chamber round chain baler, which ensures the high density of collected materials by forming cylindrical, compressed bales. The machine is intended for straw, hay and green forage harvesting. The double-string binding system shortens the binding process and protects against unbinding. The application of elastomeric springs in the flap blocking mechanism guarantees the high density of the bale, which is important to the final quality of the silage.

Pronar also offers a round baler, the Z500R, which is equipped with a rotor for initial chopping of green forage. Use of the rotor significantly affects the density of bale, increasing its compression, and this minimises air penetration of the silage. The round baler is provided with a new type of pickup header, with an increased working width of 2,200 mm, which ensures higher machine performance.

When grass or hay is formed into bales, for example, it should also



PRONAR PDK220



PRONAR PDK210



PRONAR PDT260



PRONAR PDT260C



PRONAR PDT300



PRONAR PDT300C



PRONAR PDT340



PRONAR PDF300



PRONAR PDF300C



PRONAR PDF390



PRONAR PDD830



PRONAR PDD830C



PRONAR ZKP300



PRONAR ZKP350



PRONAR ZKP420



PRONAR ZKP800



PRONAR PWP530



PRONAR PWP770



PRONAR Z245



PRONAR Z245/1



PRONAR Z500K



PRONAR Z500R



PRONAR VMP-10S



PRONAR VMP-10



PRONAR VMP-55T



PRONAR VMP-55



PRONAR PWP530 rotary tedder

be wrapped up in order to guarantee proper fermentation. The PRONAR Z245 and PRONAR Z245/1 self-loading bale wrappers are suitable for this purpose. These machines are easy to operate with their hydraulic control system. The automatic bale loading and unloading mechanism reduces the time needed for the round baler's preparation for subsequent wrapping cycles, while the foil cutter enables wrapping without

the operator leaving the tractor cab. With the Z245 and Z245/1 round balers, the process of wrapping is less time consuming and requires the involvement of less people and equipment, thereby also saving money. More information on the PRONAR Z245 self-loading round baler can be found in the article on page 28.

Marta Frąckowiak
Deputy Export Manager at Pronar



Edgar Maier: Dorfstraße 42, 72336 Balingen – Ostdorf, Germany
Farm: approx. 100 ha of pasture, approx. 280 bovine animals

- We are extremely pleased with Pronar machines, mostly the wrapper, rotary tedder and rotary rake. All the machines are practical and durable. The performance of the rotary tedder and the rotary rake is good. The mower cuts cleanly, and its operational readiness is always correct. The paint and durability of the consumable parts such as the cutting blades and rake tines are perfect. In summary, these are good machines for attractive prices.



The PDD830C double-sided disc mower with swath conditioner

AN ALTERNATIVE TO EXPENSIVE SELF-PROPELLED MOWERS

Proper selection of a disc mower appropriate to the needs and functional conditions of a farm has a great impact on the quality of the work obtained. Pronar's disc mowers are manufactured to have high strength and ensure a perfect cut.

The central suspension and adjustable mower ground pressure guarantee very good land tracking on various types of surface – from soft soils and peat to hard, dry soils. The PDD830C also operates easily on very uneven or sloping terrain, thanks to their extensive range of inclination.

The PRONAR PDD830C double-sided disc mower is the result of the joining of two disc mowers to a common coupling. The working width of each is 3 m, and the mower as a whole is designed to work with a front-mounted disc mower of not less than 2.9 m working width. The undeniable value of this combination is the large cutting width (8.3 m), which improves effectiveness and brings significant time savings. This combination is an excel-

lent alternative to expensive, self-propelled mowers.

PRONAR PDD830C disc mowers are equipped with swath conditioners, with which it is possible to reduce the silage preparation period several times over. The conditioners can be easily coupled or uncoupled from the disc mowers, depending on the user's needs. These machines allow conditioning and forming of green forage at the same time.

The fingers, made of abrasion-resistant steel, are located on the conditioner shaft and ted the mowed green forage; the metal rakes form a swath. As a result, the grass's waxy coat is diminished, leading to faster drying and ensuring better quality crops with high feed values. The intensity of the conditioning, adaptable to individual

need, can be controlled by a lever on the conditioner unit's housing.

In addition to the PDD830C disc mower, Pronar also manufactures other models of rear-mounted disc mowers: the PDK220, PDT260, PDT300, PDT340, as well as the PDD830 double-sided disc mower.

Beata Fiedoruk
Foreign Trade Specialist at Pronar





PRONAR ZKP800 double-rotor rake

WORK WITHOUT WASTE

Pronar has been manufacturing its ZKP800 rotary rake for 5 years. Due to the competitive price, low unreliability, low running costs and simple operation, this rotary rake is gaining more and more satisfied users year by year.

Although the PRONAR ZKP800 is a double-rotor rake, the initially-dried green forage is moved by just one rotor. This is a significant advantage, particularly when harvesting papilionaceous plants with fragile leaves and blossoms, such as lucerne or clover. With its wide range of working width (from 7 to 8 meters), it is a very effective machine – the maximum width of the formed swath is 1.8 meters, and so the raked material can be picked up by most models of round balers used on farms.

All parts of the ZKP800 operate independently, perfectly tracking the ground even over bumps and irregularities. The depth of work of each of the two rotors of the rota-

ry rake is adjusted mechanically, depending on the soil conditions.

The machine is fitted with a transmission produced by a renowned manufacturer. The raking fingers are made of heavy duty steel and can deflect obstacles of up to 120°, then return to their natural position without any signs of wear, while the shock absorbers used improve the working comfort of the machine.

The connection of the rear wheels' rods to the tractor's three-point linkage make the PRONAR ZKP800 suitable for operation in small grassland areas. All material is raked without waste – even on tight curves – and the rolls are formed without fuss or extra dirt.

To ensure long, trouble-free operation, the machine's moving parts should be lubricated with grease. Furthermore, the oil level in the transmission should be monitored. Any play between moving parts should be tightened down, and proper tire pressure maintained. The rotary rake, which weighs almost 2 tonnes, can be fitted to tractors with engine power of 80 HP.

In addition to the double-rotor ZKP800, Pronar manufactures single-rotor rotary rakes, including the ZKP300, ZKP350 and ZKP420, which have working widths of 3, 3.5 and 4.2 meters respectively.

Łukasz Pycz
Pronar Sales Representative

The PRONAR Z500K round baler

GUARANTEES HIGH FORAGE QUALITY

The PRONAR Z500K, the modernised version of the Z500, is a modern and efficient fixed-chamber round chain baler, which ensures high bale density by forming cylindrical, compressed bales.

The bale shape and compression level are important to every farmer for economic reasons, because these factors affect production profitability – dense bales reduce costs. They also give a quicker start to the fermentation process of the collected grass, and this improves forage quality. The PRONAR Z500K round baler is characterised by a modern design. Its guards have a thickness of 5-7 mm and are made of composite materials, making them light. Additional strengthening with

a steel rack also improves their durability.

The unquestioned advantage of Pronar's Z500K round baler is its solid swath pickup header. This is zinc-coated, has a working width of 1,800 mm, and is equipped with 48 double fingers. This mechanism ensures proper ground tracking and exact collection of mowed grass or straw, without leaving residue in the field. The wide supporting rollers have rubber tires – a feature that is necessary for proper operation of the machine, and so-



mething often overlooked by users. Its rollers guarantee optimum shock absorption of the pickup header and precisely track the ground, even in wetland areas.

The round baler PRONAR Z500K has been designed not to cause environmental losses. It has low running costs, high reliability, comfortable operation and broad functionality.

Karol Tatarzyński
Foreign Trade Specialist at Pronar



New conveniences in the PRONAR Z245 coupled bale wrapper

SOLID PERFORMANCE, ATTRACTIVE PRICE

The PRONAR Z245 bale wrapper has low power requirements (48 HP), making it suitable for medium and large-size green-crop farms. The Z245 is characterised not only by solid performance and construction stability, but also an attractive price.

The automatic bale loading and unloading mechanism of the Z245 bale wrapper reduces the preparation time for subsequent wrapping cycles. The machine is equipped with a side-on bale grabbing system, with approach from the front of the bale. The loading arm brings the bales to the wrapping table without stopping, which means that the whole operation can be performed with just one tractor. The turntable allows unloading of bales in two ways: lain on the ground horizontally, or standing up. The device is suitable for wrapping bales with a diameter

of 1,000 to 1,800 mm, and weight of up to 1,100 kg.

The Z245's foil feeder has an integrated transmission for proper tension, and can handle wrapping with foil of 500 mm and 750 mm. The 340/55-16 tires on the bale wrapper ensure appropriate mobility on wetlands.

To improve its functionality, the Z245 is equipped with many elements that facilitate easier operation. These include an electric control system for four baling options, with programmable wrapping numbers by means of an LCD panel. This significantly reduces the time ne-

eded for preparation of subsequent wrapping cycles, and makes the operator's work easier. The movement speed of the turntable is also greatly improved on previous models. Furthermore, the electric control system is provided with an audible signal announcing conclusion of the wrapping process. Finally, control of the LCD panel and functions of the Z245 is selectable between Polish, English, Spanish, Portuguese, French, Russian and Czech languages.

Katarzyna Żukowska-Matuk
Foreign Trade Specialist at Pronar



The PRONAR MRW 2.85 Low-speed Mobile Shredder – part of a modern sorting line

HELPS WITH RECYCLING AND DISPOSAL

The start of the waste segregation and disposal process should be preceded by initial shredding of piled waste. This can result in waste of various compositions, but with a fraction allowing a fast, efficient and safe disposal process to be continued. Therefore, a shredding machine is a vital part of a modern waste sorting, processing and disposal line.



Fuel tanks with total capacity of 700l



Conveyor belt advance rate adjustment



Machine operating mode status indicator - for status check and security warnings



Central control panel with touchscreen

Remote control for basic machine operating functions



Hydraulic support legs improve machine stability during operation



Thanks to remote control a hydraulically raised chute increases machine output and operator's work comfort



European road homologation for transport up to 100km/h.



Central lubrication system



Engine cleanfix system - automatically cleans the engine radiator ensuring uninterrupted overheating issues in dusty conditions



Hydraulic oil radiator cleanfix system for optimal and uninterrupted operations





Collected waste requires prior segregation and separation, among other things, of as much material as possible that can be recycled, or whose untreated disposal could harm the environment. Because of its large overall dimensions, some waste (such as various roots, so-called wood scraps, furniture and building waste), requires initial shredd-

ing. It then becomes valuable material for screening only after this process.

Pronar is both a watchful observer of the dynamically-developing waste management market in Europe, and a manufacturer of machines ensuring effective and economical provision of such services. One such machine is the high-per-



Different types of shredding shafts are available

formance, exceptionally durable low-speed MRW 2.85 shredder. The working components of this Pronar shredder are two low-speed shredding shafts, each with eight operating rings. Each ring is equipped with five cutting blades installed around its circumference. The synchronous operation of the shafts ensures very high performance. The operator can select the optimum operating parameters for the shafts, depending on the material being shredded. In the case of an overload, the shafts automatically change their direction of rotation, then return to the previous operating parameters. The great advantage of this system is that it continues to use the machine's full capabilities while simultaneously protecting its sub-assemblies against damage.

For a few seconds, the change of direction of the shafts' rotation can be manually induced, either by

changing the machine's settings or by overloading the machine's hydraulics. This reversal prevents shredded material from getting twisting around the shafts. It is also possible to install an optional smooth shredding beam, or a shredding beam with welded counter-blades. Mounted under the shredding shafts, these elements allow the machine to produce material fractions of the expected size.

The drive unit of the PRONAR MRW 2.85 shredder is a modern, environmentally-friendly 298 KW CAT engine, meeting the requirements for gas emissions set by the latest, Stage 4/4 Final standard. The connection of this high-class engine, drive train and power transmission to the shredding shafts (made by the world's leading manufacturers), gave us the opportunity to produce a de-

sign that satisfies the highest requirements for machinery producing alternative fuels.

The shredded material is moved directly onto a conveyor belt, from where it can be dropped onto piles or directly onto a truck. Due to the impressive 6.45m length of the conveyor, material can be loaded to a height of more than 4 m.

Upon request, the PRONAR MRW 2.85 shredder can also be fitted with a magnetic separator over the conveyor belt. The separator is used to separate metal elements from the waste.

The MRW 2.85 can be operated by remote control, which improves the operator's safety and comfort. Standard equipment with the machine includes a central lubricating system, which reduces downtime and daily maintenance to a minimum.

The unquestionable advantage of the PRONAR MRW 2.85 is its mobility. Despite its large mass, the machine is designed to be transported on public roads, and with its European type-approvals it can be registered for carriage on public roads across the European Union.

The combination of the MRW 2.85 with a Pronar screener (for example, the MPB 20.55) on a single technological line results in effective and precise segregation and shredding of waste, as well as sorting of individual elements (such as ferromagnetic materials). Detailed technical parameters of the PRONAR MRW 2.85 shredder are available at: www.pronar-recycling.com

Piotr Wasiluk
Deputy Manager of the Manual
Machinery Section in the Implementation
Department at Pronar



MRW 2.85 together with MPB 18.47 in a tree stumps processing line

Municipal machinery

COMPREHENSIVE OFFER

Pronar's extensive product range includes equipment for winter and summer road, roadside and green area maintenance. Pronar machines are intended for operation with the various types of carrier vehicles used by public utility companies.

The company's history is closely and inseparably linked to the production of PRONAR brand tractors. Over the years, Pronar has introduced several types of tractor to manufacture, which have found buyers on many European markets. The experience earned this way has allowed the Company to prepare a broad range of functional products for users of municipal tractors, which can be divided into winter and summer lines. The wide variety of products for winter road maintenance comprises simple and V-type snow scrapers and ploughs, suspended spreaders, towed spreaders and snowblowers. The summer equipment line includes versatile suspended swe-

epers, towed sweepers, mulchers and many sets of hydraulic arms with various working heads that can be adapted to work with lorries.

Other Pronar municipal equipment consists in machines for earthworks, including road graders and ancillary products (e.g. hydraulic feeders and water tanks). These machines work with both tractors with low engine power (about 25 HP), as well as the biggest tractors, with engine power of over 200 HP. All of Pronar's machinery has been designed to suit not only the engine power of the tractors used, but also to the typical scale and intensity of the tasks.

Pronar also manufactures machinery for use with trucks. The-

se machines are suitable for works on roads and motorways, and in other places where carrier vehicles, performing municipal services, must run faster. These lines include many models of snow plough.

The simple, light ploughs have plastic mouldboards and are designed for use with smaller carrier vehicles. In contrast, Pronar's heavy steel ploughs and special telescopic ploughs with a width of up to 6 m, designed for cleaning motorways and airport runways, should be used in the case of severe winters.

The battle with winter's effects cannot be limited only to snow removal – it's also necessary to remove



Pronar ZMC 2.0

ice and sleet from roads, and increase traction on roads and pavements. Therefore, Pronar also supplies machinery for surface sanding, gritting and spreading of other substances, that can be attached to trucks (with load box capacity of 1.5 to 9 m³). To improve the functionality of its products, on request Pronar can install different types of drives, to guarantee compatibility with most public utility vehicles. Its machines, depending on the model, can be powered by electric or hydraulic drives, with self-contained internal combustion engines or dragged wheels.

In 2014, Pronar began production of recycling machinery, with its MPB mobile trommel screens. These are designed for companies working in waste management and with renewable energy. Pronar manufactures four models of these machines, with screen trommels with a diameter of 1.4 – 2 m, and length of 4.4 – 7.2 m. Each of these machines can be adapted for screening of compost, wood waste, earth from excavations, construction waste, debris, stones and clay.

The trommel screens have European type-approvals, so they can be registered for use on public roads across the European Union (at rotational speeds of up to 100 hp/h). Due to their overall dimensions, the trommel screens can be transported on public roads without additional authorisations. The EBS braking system mounted as standard, guarantees comfortable and safe driving.

All Pronar's recycling machinery can be tailored to the individual needs of the user, thanks to optional accessories and the possibility of adapting the trommel to screen various materials.

Łukasz Śliwski
Foreign Trade Specialist at Pronar



PUS-252H snow plough with EPT15 sand spreader mounted on Iveco truck



PRONAR P5 Tractor with WWP500 + GK110 moving set (front) BK160 mulcher



Mobile Trommel Screen PRONAR MPB 20.55



This PRONAR MPB 20.55 trommel screen was ordered by a Dutch company, and was painted matt blue to match their company colours.

Mobile trommel screens

QUALITY, FUNCTIONALITY AND CUSTOMER RELATIONS

Last year, Pronar posted significant growth in its mobile trommel screen sales, with subsequent models sent to market in Poland, EU countries and Turkey. Pronar's engineers design machinery that meets the legal regulations associated with municipal waste treatment and regeneration of industrial areas in both the domestic market and foreign markets – all of Pronar's machines can be adjusted to suit the specific needs of individual markets. By satisfying these requirements, Pronar products successfully find buyers in many other countries.

Manufacturing of the mobile trommel screens is planned so that every model can be adapted to individual companies' needs. This is not simply a matter of having a great number of accessories that increase the functionality of the machine, but Pronar's efforts to ensure that each function broadens the range of services that each buyer can then offer to its own customers.

This adaptation of its recycling machines (trommel screens and crushers) to customer needs includes performance enhancements, suitability for use with different kinds

of screened material, accessories and planned operating conditions. After more than two years of producing the trommel screens, Pronar's product range is more extensive than that of many other manufacturers that have been functioning much longer on the market.

The weight of the mobile trommel screens manufactured by Pronar varies from 11 to 25 tons, their screen surfaces from 16.2 to 40.6 m², and engine power from 43.5 to 125 HP. Both smaller and more mobile models are available, as well as models with improved performance and

higher maintenance costs. The type of engine used is also one of the selection criteria, and these include Deutz or Caterpillar combustion engines, meeting EU Stage 3B standards, or an ecological electric motor. This is primarily used by machines operating indoors.

Track-mounted trommel screens are something of a novelty in the recycling machinery lines. With its tracked chassis, weight can be distributed over a larger area than the area of the wheels, which significantly reduces pressure per unit area. Therefore, the screen will be able to move

through terrain inaccessible to wheeled machines – sand, mud or snow.

From the customer's perspective, an important issue is choosing a screening trommel that will work with the material they're dealing with. Pronar offers trommels with various skin thickness, mesh sizes and shapes, and because different trommels can be used in the same machine (exchanging a trommel takes about thirty minutes), the trommels can be adapted to the material fraction and type (earth, wood, municipal waste or coal). The grate over the hopper of the trommel screen prevents heavy materials with larger dimensions from entering the trommel and damaging it.

The different models of the machines, the choice of engine types and accessories, all allow optimal configuration of the machines for each buyer. All this makes the operating costs of the screen a small fraction of economic benefits resulting from its use. At the buyer's request, the machines can be painted in any RAL matt or gloss colour. For many customers, this is essential for marketing reasons – machines with company colours are much more easily recognized.

Pronar's reputation and the popularity of its brand are also built through positive relations with our customers. Their feedback is always considered by our designers, and the meetings with salesmen at trade fairs and exhibitions form, amongst other things, the basis for updates to our product lines and the introduction of new features. For example, the use of remote control units and trommel load sensors, the use of which can reduce operating costs, both resulted from customer feedback.

Bartosz Tomczak
Foreign Trade Specialist at Pronar



Trommel for screening municipal waste. The blades facilitate separation of plastic bags.



Trommel with a sheet metal thickness of 6 mm and mesh size of 40 mm. This makes it suitable for screening earth and organic waste used in composting.



Hopper grate. This helps stop bigger pieces of debris entering the work area when screening materials with larger dimensions. The grate is not necessary when screening lighter materials (chips, etc).

Multifunction hydraulic arms and working heads

WIDE VARIETY TO CHOOSE FROM

Multifunction hydraulic arms fitted with selectable working heads are used in the maintenance of urban greenery, roadsides and working in orchards, woodlands and agriculture. Seven models of these machines, manufactured by Pronar, ensure that customers can choose the right hydraulic arm and working head for their needs.

The WWP600 and WWP500 multifunction hydraulic arms are intended for installation at the front of a tractor. This gives the operator excellent operational comfort, with good visibility and improved safety during forward travel.

The hydraulic arm is mounted on a horizontal rail, on which it can be moved back and forth across the front of the vehicle, which increases the arm and head's manoeuvrability. The design of the hydraulic arm – a sliding rail and a telescopic boom – allows for work in roadside ditches and over barriers. This also gives the possibility of working between road signs, poles and trees, without having to park and re-park the entire tractor. The operation of the hydraulic arm and working head is controlled from the cab by a joystick.

The WWP500U and WWP500UH models have a reach of 5.5 m and are designed for use with Unimogs (the

multipurpose Mercedes-Benz trucks), or municipal lorries. The PRONAR WWP500U is driven by the hydraulic system of the carrier, while the PRONAR WWP500UH uses the front power take-off shaft of the vehicle. Both hydraulic arms are attached to the vehicle by DIN 76060 Type A/B front plates, which makes them easy to attach and detach. This is further facilitated by a transport and assembly trolley (also manufactured by Pronar), which is provided with a hydraulic lifting arm to attachment height. The essential advantages of all four of the hydraulic arms described here include hydraulic movement on a front, horizontal axis, and easy joystick control from the operator's cab.

The WWT420 hydraulic arms (weight 620 kg) have a reach of 4.2 m, and the WWT480 (weight 645 kg) 4.8 m. These two models are intended for installation at the rear of a tractor. Their low weight and low power requirements

(both 55 HP) ensure their compatibility with many different makes of tractor. Both hydraulic arms are equipped with independent hydraulic systems driven by power take-off shafts through power transmission shafts, a multiplier and two pumps. One of these drives the working head, and the other – via three hydraulic cylinders – controls the arm and the working head's position.

Control of the arm and head is through levers located in the operator's cab. The ground is tracked perfectly, with the floating head function, while the machine is protected from damage running into obstacles by a mechanical safety device.

The PRONAR WWT600 hydraulic arm has a range of 6 m, and works with tractors over 4 tonnes and engine power of 80 HP-plus. The fact that the machine is driven by a power take-off shaft that turns at 540 rpm and is suspended from Cat. II rear three-point linkage means that it can be easily and quickly coupled and decoupled from the operator's vehicle.

The independent hydraulic system is driven by the multiplier from the power take-off shaft. Two independent hydraulic pumps are responsible for feeding the drive of the working head and the movement of the arm. The 180 litre oil tank counterbalances the arm when extended sideways. Again, control takes place via levers located in the operator's cab, connected by a distributor.

The hydraulic arm is fitted with a hydraulic safety device protecting it



WWP500U hydraulic arms are designed for use with MB Unimog vehicles



from damage from running into obstacles on difficult terrain, for example roadside trees and lamp posts. The safety device causes the arm to automatically foldback into the transport position.

The following Pronar working heads are designed for use with the multifunction hydraulic arms described above:

- GK 80L – Light cutting head equipped, with Y type flail cutters (working width 800 mm),

- GK100L – Light cutting head, equipped with Y type flail cutters (working width 1,000 mm),
- GK 110 – Heavy cutting head, equipped with flail hammers (working width 1,100 mm),
- GK 140 – Heavy cutting head, equipped with flail hammers (working width 1,400 mm),
- GP 200 – Branch cutter (working width 2000 mm),

- GO 800 – Digger, for cleaning drainage ditches,
- GM 500 – Washing head, for cleaning road signs and posts.

The popularity of Pronar's multifunction hydraulic arms and working heads means that Pronar's designers are constantly working on subsequent models.

Krzysztof Januć
Foreign Trade Specialist at Pronar



BK180

Mulchers

WHICH MULCHER SHOULD I CHOOSE?

Pronar's flail mowers (so-called mulchers) can be divided into two groups: rear-side mulchers with yaw control (the BBK and BBK-M series) and rear-front mulchers (BK and BK-M).

The Pronar BBK and BBK-M series of rear-side mulchers have a cutting width of 1,600 to 2,000 mm, and are designed for maintenance of roadsides, ditches, urban greenery and working in orchards, woodlands and in agriculture. These machines are used for cutting and chopping weeds, grass and brushwood as well as for shredding cut-off tree branches (up to a diameter of 10 cm) on roadsides, embankments, in drainage ditches and in water channels.

These flail mowers are also used to reclaim grassland over undeveloped areas while also leaving swathes untouched, and to rip up remnants (stalks) left in fields after maize or tobacco crop harvesting. The mulchers mow and shred at the same time, spreading it equally over the entire mowed area, enabling the formation of natural swathes, mineralization of plant remnants and their reintroduction into the soil.

The flail mowers of the BBK and BBK-M series are ideal for cut-

ting roadsides and areas with a variable angle of inclination. Their range of adjustment of their operational angle is very important, and ranges from +94° to -65°. This ensures free cutting in barely accessible places, e.g. in drainage ditches or near hedgerows. Furthermore, one of three cutting heights can be used: 20, 40 and 60 mm (adjusted by a tracking shaft). However, due to its wide movement range of 1,820 mm, it is possible to manoeuvre the mulching head between trees, poles, signs and road bar-

riers, without changing the path of the machine. The mulchers are provided with an anti-collision safety device, which in the case of running into obstacle, raises and draws the mulching head back. And with their special pantograph suspension, the mulchers can be operated from the sides or the back of the tractor.

The BK and BK-M series are also designed to mow flat surfaces. These machines can be used to clean fields after maize or tobacco harvesting and to reintroduce remnants to the soil. They are also used in orchards to clean the spaces between rows of fruit-bearing seedlings, bushes and trees.

The Pronar rear-front flail mowers of the BK series are universal machines. Thanks to the construction of the drive and suspension systems, these mulchers can be coupled with both front and rear three-point linkages. To attach them to the front of a tractor, the carrier must be provided with a front three-point linkage and clockwise- or anticlockwise-operated power-take-off shaft, as in the case of rear-mounted mowers. The BK and BK-M series allow for changing of the working position. This is a very simple procedure, as it is sufficient to simply remove the retaining bolts and rotate the fixture by 180°. Another improvement on older models is the control system which is mounted in the tractor cab.

The flail mowers work slowly and under high loads. Their working mechanisms are resistant to contact with obstacles, irregularities and molehills. Therefore, their power requirements are significant, and they can be coupled with tractors with engine power of at least 50 HP. But the BK and BK-M series mulchers will effectively break down almost every material. They're also very tough – even large stones and municipi-

pal waste cannot damage them. The versatility and performance of Pronar mulchers is increased by their replaceable cutting blades; which number from 14 (in the BBK160M) up to 54 (in the BBK200M). There are also available hammer-shaped blades (ideal for shrubland), Y-shaped blades (for grass) and so-called hen's feet-shaped blades (which additionally loosen and aerate the soil under the mowed grass).

In choosing an appropriate flail mower, it is necessary to con-

sider, among other things, the types of terrain and its inclination that you will be working on, as well as tractor power. Pronar dealers are happy to help you verify whether your tractor's engine output will be appropriate for use with the model you're considering, and also with the best selection of blades appropriate to the work you'll be doing.

Aleksander Zacharczuk
Foreign Trade Specialist at Pronar



BBK 200



BK160M

Truck-mounted spreaders

WIDE SELECTION OF POWER AND WORK PARAMETERS

Pronar is one of the leading manufacturers of winter road maintenance machinery. In addition to its many truck-mounted snow ploughs, the Company offers also a wide selection of truck-mounted spreaders.

The smallest Pronar spreader is the EPT-15, which works with light trucks with a load capacity of not less than 2.8 tonnes. Thanks to its electric drive train, the spreader does not require the carrier vehicle to be equipped with an expensive hydraulic system or additional combustion engine, making it highly eco-efficient. And with its compact dimensions, the EPT-15 works very well with light vehicles that can be easily driven down the narrow streets that large municipal vehicles cannot negotiate. Use of special supports and transport straps makes the spreader's mounting and removal from truck beds easy, and without the need for a crane. The spreader can be mounted on vehicles with a 12 or 24 V electrical power supply. A grate (which can be covered by a waterproof tarpaulin) over the top of the spreader's 1.5 m³ hopper prevents caked material from being loaded.

The PRONAR HPT-25 spreader uses a hydraulic power supply, and is also designed to be mounted in trucks. The volume capacity of its aggregate hopper is 2.5 m³, and thanks to the tanks mounted on either side of the machine (total capacity of 900 litres), brine can be also carried for spreading over icy surfaces. The high precision of the electronic control system installed in the HPT-25 allows for adjustment of spreading width from 2-12 m, aggregate dosage thickness from 50-200 g/m², and chemical agent release of 5-40 g/m². The spreader can be equi-

ipped with a GPS system to carefully monitor the operation of the machine. And just like the PRONAR EPT-15, a de-caking grate and hopper cover tarpaulin are fitted.

The PT-40 series consists of spreaders with a larger load capacity and greater efficiency than the EPT-15 and HPT-25. A drive train system is also characteristic of each model in this series. For example, the PRONAR KPT-40 is driven by a rear towed wheel; the PRONAR HPT-40 by the hydraulic system of the carrier vehicle, and the PRONAR SPT-40 by its own combustion engine. The machines are equipped with 1,800 litre brine tanks as standard. The aggregate hopper on each model (4.5 to 6 m³) can be adapted to the load capacity of the carrier vehicle. Each spreader is controlled from the carrier vehicle's cab by means of a control panel with an electronic display. The operator's comfort is increased with by a GPS system, which also logs the machine's work. Storage supports for the spreaders are part of standard equipment. Adjustable parking supports (optional) allow for loading and unloading of the spreader onto a truck without the need for additional devices (such as lifts, cranes etc).

The PT-70 is the newest series of Pronar spreaders. The PRONAR HPT-70 is powered by the hydraulic system of the carrier vehicle, and the PRONAR SPT-70 by its own combustion engine. The standard volume capaci-

ty of the brine tanks mounted in these spreaders is greater than the volume capacity of those in the PT-40 spreaders, at 2,700 litres. However, the capacity of the aggregate hopper, which can be adapted to the load capacity of the carrier vehicle, can be 7, 8 or 9 m³. The framework serving as the base of the machine is protected by dip galvanisation (or other, according to the customer's choice), and an anticorrosion coating. Standard equipment, as in the PT-40 series, includes an electronic control panel, a hopper grate (to protect against caked materials) with retracting wings, and a waterproof tarpaulin. In the standard versions of the SPT-70 and HPT-70, the parts of the dosage system exposed to corrosion are made of stainless steel, while (on request), the mounted aggregate hopper can also be made of stainless steel. This ensures a long service life.

Snowblowers

IRREPLACEABLE IN HEAVY SNOWFALL

Snowblowers are designed to remove snow and ice, as well as crush and move it to the roadside or onto a trailer. With their robust design and high efficiency, Pronar snowblowers can operate even under heavy snowfall conditions.

PRONAR OW snowblowers are usable with different kinds of carriers, such as agricultural tractors, loaders, backhoes and various municipal vehicles. The OW machines can be attached to rear or front (snowblowing while driving forwards) three-point linkage systems.

Pronar manufactures three models of snowblower: the OW1.5, OW2.1 (in an 'M' variant with a mechanical drive, and an 'H' for the hydraulic variant), as well as the OW2.4 1 (also in mechanical and hydraulic variants). The same working principle applies

to each one. A steel blade shovels the snow and ice up, which is then moved via a worm drive, crushed, and transferred to the rotor. The rotor then carries the shovelled and crushed material at high speed to a discharge chute, through which it is discarded at distances of up to 30 metres.



PRONAR HPT-25 spreader designed for mounting on trucks

The discharge chute has full 360° rotation, while its adjustable end is used to set the throw range. The snowblowers can also be equipped with an extended discharge chute, from which snow is thrown directly onto the trailer. This is a great advantage

while working in urban areas, where there is no place to dump the snow. Pronar snowblowers shorten the time needed and reduce loading costs, in comparison to use of a snowplough and additional snow loading machine, as they can perform all of the necessary operations.

tenance of road surfaces, by both small companies and large motorway crews or airport services.

Piotr Leoniuk
Foreign Trade Specialist at Pronar



This year, Pronar has also launched a new product – a the OFW high-performance rotary cutter

snow can block or damage snowblower mechanisms, both the worm and the rotor are provided with a clutch with shearing elements. All of Pronar's snowblowers are also fitted with a wooden stick, for removal of snow if the machine gets blocked.

The OW1.5 is the smallest and simplest PRONAR snowblower. The machine is driven by a power take-off shaft and connected to the carrier vehicle's three-point linkage system (Cat. II and III). Its 1.5-metre working width makes this model mainly effective in removing snow from smaller surface areas (small yards, gardens, pavements, etc). The great advantages of the OW1.5 is that despite its solid construction, it has a relatively low weight of about 300 kg, as well as a low power demand from the power take-off shaft of the carrier – just 25 HP. The discharge chute can be hydraulically rotated, through the worm gear, from the operator's cab. The vertical position is set manually from the machine.

The next model in this series is the OW2.1, which is available in two versions – mechanical, driven by a power take-off shaft (OW2.1M) and a power demand of 50 to 95 HP, and hydraulic (OW2.1H). In the hydraulic snowblower, the oil demand ranges from 100 to 140 l/min; when oil output from the carrier is insufficient, the snowblower can be connected to a PRONAR ZHD 170 or PRONAR ZHZ 100 hydraulic feeder.

The working width of these snowblowers is 2.1 m for the basic model. This can be increased with optional accessories by 20 cm on the right-hand side, and 15 cm on the left. The high throw chute, used to load the collected material directly into a trailer, is also an optional accessory. Compared to the OW1.5, in this case the discharge chute's end, used to control the throw range, is adjusted electro-hydraulically from the operator's cab. The rotation of the discharge chute (360°) is controlled from the same place.

The largest PRONAR snowblower, the OW2.4, is also available with a hydraulic (OW2.4H) or mechanical (OW2.4M) system. The feature that distinguishes the OW2.4 from the other models is its pick-up chamber, which consists of two picking and crushing worms. The working width of this snowblower (2.33 m) can be increased with optional extensions by 20 cm on the right-hand side, and 15 cm on the left. With its overall dimensions and great working efficiency, the power demand of the PRONAR OW2.4 is higher than the other models'. The mechanically-driven version needs 70-150 HP, while the oil output in the hydraulically-driven version amounts to 135-195 litres of oil per minute. As in the case of the OW2.1, with tractors that have a hydraulic pump output lower than recommended, this can be increased with the PRONAR ZHD 170 or PRONAR ZHZ 100 hydraulic feeder.

This year, Pronar has also launched a new product – a the OFW high-performance rotary cutter. The machine has a working height of 120 cm and is fitted with a specially-designed cutting roller, ideal for removing thick snow cover. Its 2.6 m working width ensures a broad, clear traffic lane after just the first run. The OFW is driven by the power take-off shaft of the carrier vehicle – versions are available that work with tractors and trucks with power ratings of at least 135 HP.

Pronar snowblowers are especially well-liked by users across Europe. They can be found working in the mountains of Austria, Switzerland and Germany; on the slopes of the Carpathian Foothills in Romania and in Balkan and Scandinavian countries too.

Łukasz Śliwski
Foreign Trade Specialist at Pronar

TRAILERS





The PRONAR T386 Hook lift trailer

NEW GIANT

The T386 is the largest and latest Pronar hook lift trailer. Like other hook lift trailers, the PRONAR T386 can be used for various tasks, including in agriculture, the construction industry, public utilities and horticulture. It is ideal for the collection, transport, unloading and setup of various types of containers with a length of 5 to 7.5 m, such as box containers, flat containers, dumpers, tanks and many others. The multi-functionality of these hook lift trailers also gives them improved performance, lower investment and maintenance costs, and the possibility of using the trailer year-round, irrespective of the weather.

The chassis of the T386 consists of a Tridem mechanical suspension cushioned by steel springs, with three axles, of which the first and the third are actively steered.

The T386 is another Pronar trailer that is equipped with a hydraulic-adjusted and cushioned drawbar. With its hydraulics system, the link height can be smoothly adjusted to

meet the tractor coupling, and the mounted hydraulic dampers protect the drawbar and supporting frames from vibrations and shocks generated during use. The loading

mechanism consists of three interlocking frames.

Unlike the loading systems in earlier Pronar trailers, the towed hook frame of the trailer PRONAR T386 uses a telescopic folding and unfolding system based on a hydraulic cylinder. This can increase or decrease the load on the rear wheels of the tractor. Like the earlier models, the trailer PRONAR T386 can be used to transport containers, or to work as a tipper. Operational functions are switched automatically. The loading and unloading or tipping process (depending on the mode of) is supported by two hydraulic cylinders. Each tipping cylinder is equipped with a brake that reduces the travel speed of the trailer frames in the last phase of folding.

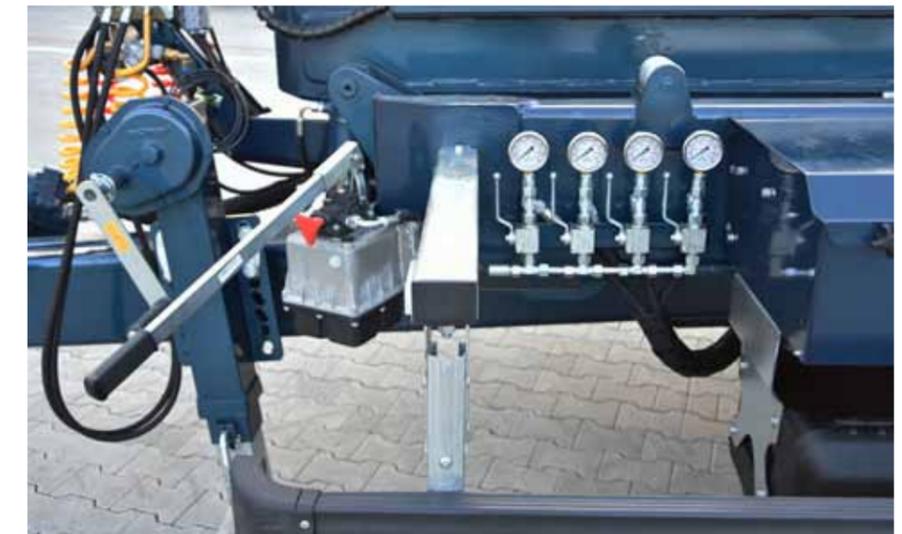
To protect containers during transport, a hydraulic container lock is mounted on the rear frame of the loading system. Unlike the mechanical container lock, the hydraulic container lock requires no changes to the position of the attachment points when a transported container is canted. And like the earlier T286, the PRONAR T386 has a rear bumper, operated by two hydraulic cylinders. All the hydraulics on the trailer are controlled by a hydraulic distributor, which is standard equipment.

The trailer's electric control panel also features LEDs that indicate the current settings and positions of the individual frames of the trailer, significantly increasing work comfort and efficiency. The control module constantly checks whether the particular functions of the trailer are being activated in the correct order, to avoid damage to the trailer or container.

Przemysław Rogala
Foreign Trade Specialist at Pronar



Rigid frame with 2 hydraulic actuators



All hydraulic cylinders are controlled by a hydraulic distributor, which is in standard equipment of the trailer



Hydraulic rear bumper



Single-axle manure spreaders

SERIES V LARGE-WHEELED MANURE SPREADERS

The Series V manure spreaders are part of a wide range of machines manufactured by Pronar. These single-axle manure spreaders enjoy special interest from our farming customers around the world. Their V-shaped hoppers and large-diameter wheels are the most characteristic features of the machines in this series.

Other interesting features of Series V spreaders (PRONAR NV161/1 and PRONAR NV161/2) include:

- High manure spreader wheels with less rolling resistance,
- Monocoque V-type hopper with low loading edge,
- Cushioned manure spreader drawbar with a strong tie for transferring high vertical loads. With this, the tractor's rear wheels are always properly loaded and the vehicle won't get bogged down in wet or marshy terrain,
- Two-roll vertical adapters for wide, precise spread and high performance.

Standard equipment in PRONAR Series V single-axle manure spreaders includes:

- Monocoque, self-supporting load platform,

- Rigid single-axle suspension,
- Vertical 2-roll spreading adapter,
- Chain conveyor made of high-grade steel, with two 14 mm chains, a hydraulic drive and step-less feed speed control,
- Cushioned drawbar for coupling with lower or upper tractor hitches,
- Rotational drawbar hitch with 50 mm towing eye,
- Simple mechanical telescopic drawbar stand,
- Hydraulic control from the tractor's distributor,
- Pneumatic double-line braking installation,
- Single-line lubrication adapter system,
- Crank handbrake,
- 12 V lighting system,
- Two parking wedges for the wheels, stored in galvanised pockets,

- Ladder and sideboard steps facilitating hopper access.

Optional equipment for PRONAR Series V single-axle manure spreaders includes:

- Pneumatic single-line braking installation,
- Hydraulic braking installation,
- Hydraulic slider,
- Hydraulic double-wing rear guard (closing one wing helps edge spreading),
- Rigid drawbar hitch with 40 mm towing eye,
- Rigid drawbar hitch with K80 mm ball,
- Standard power take-off drive shaft,
- Wide-angle power take-off drive shaft,
- Metal mudguards.

Krzysztof Smoktunowicz
Implementation Department, Trailer Section
Manager at Pronar

PRONAR T028KM Trailer

THE LARGEST FROM THE BALE TRAILER LINE

The T028KM trailer made its public debut last year at the world's largest agricultural machinery trade fair, the Agritechnica 2015, in Hanover, Germany.

In comparison to the previous models of bale trailers, the PRONAR T028KM is characterised by the maximum permissible laden mass (24,000 kg). The trailer is 12 m long, 2.5 m wide and 3 m high.

One of its great advantages are the special mounting points in the loading platform, for installation of stanchions on each side of the trailer. The stanchions have properly-shaped, closed profiles, and closely resemble steel bars with a square cross-section. Their basic function is to protect loads during transport, in particular wood (both short pieces, slightly over one meter long, and long trunks). The stanchions have a height of 1.2 m (additional equipment). To-

gether with the loadable surface of the trailer (24 m²), they ensure better load stability. With the stanchions in place, the weight of the load can also be increased to the maximum permissible laden mass of the trailer (24 tonnes). In practice, this means substantial time and money savings.

Removing the stanchions increases the loadable surface of the platform. This can be done by one person. It is then easier to load bales, straw blocks, hay blocks or loads on pallets or in pallet-boxes. When transporting a load, the stanchion mounts are secured with rubber plugs, which protect foil-wrapped bales from mechanical damage. However, the greatest advantage of the T028KM is its (optionally

purchased) hydraulic side walls, which significantly reduce the time needed to secure a load, compared to fastening it with transport straps. Furthermore, the hydraulic side walls secure loads more effectively than straps.

The PRONAR T028KM combines the functions of bale and forestry trailer. This is a universal product, which helps reduce the costs of running a farm, in both the agricultural and forestry sectors.

Pronar also manufactures other models of bale trailer: T022, T022M, T023, T023M, T024, T024M, T025, T025M, T025KM, T026, T026M and T026KM.

Mariola German-Pietruczuk
Foreign Trade Specialist at Pronar





PRONAR T400R Forage Wagon

FOR HIGH-PERFORMANCE FARMS

This year, Pronar began serial production of its T400R Forage Wagon. The T400R was designed on the basis of the T400 and has a load volume of 41 m³. With a large load capacity and high throughput rate, it's a multi-functional forage wagon that can easily handle the large quantities of green forage for animal feed, expected in modern farm harvesting.

The PRONAR T400R is designed for use with tractors of not less than 182 HP, and has a power take-off shaft that spins at 1,000 rpm, operational pressure of up to 200 bars in its hydraulic system, and an oil pump capacity of up to 130 l/min. The trailer is based on a Tandem hydraulic suspension with four half-springs, a wheelbase of 1,810 mm, a front rigid axle and rear actively-steered axle, and is hydraulically adjusted and cushioned. As standard, the rear steering axle minimises ground surface damage and tire wear when driving on asphalt. The size of the tires is 700/50R26.5.

The chassis of the forage wagon is made of robust, rectangular, closed profiles. The loading platform consists of stringers made of high quality steel, and poles made of closed profiles, to which profiles with a special anticorrosion coating are fastened. The front wall and tailgate are hydrau-

lically opened. Additionally, the metal guides for the conveyor chains are installed in a wooden plate in the floor.

An essential element of this bulk-volume wagon, on which its performance depends, is the pick-up. The T400R is equipped with a 2 m-wide cam pick-up. With its cam mechanism, at the moment of contact with soil the pick-up tooth accelerates, and the material is collected not only accurately, but at high speed. The pick-up is formed by 8 rows of 'fingers'. Adjustable feeler wheels ensure perfect land tracking without damage to ground surfaces.

The most important component of the T400R is the loading rotor, which has a diameter of 800 mm and eight radial rows of arms, made of wear-resistant steel. The cutting system consists of 45 blades made of hardened tool steel. The theoretical cut height is 34 mm. Each blade is individually protected against dama-

ge. This means that at the moment of collision with stones or other object, the blade is tilted. This may cause it to become blunted, but not broken. The cutting blade then returns to its starting position. It is also important to note that the blades can be changed without the use of special tools.

The PRONAR T400R Forage Wagon is a good investment for farms handling large areas of grassland, and for companies providing agricultural services. With the T400R, it is possible to simplify work, give up using additional equipment for transportation of green forage, and reduce labour and fuel expenditure. The high cutting accuracy, operational comfort and safety as well as its high performance at every stage, from harvesting to unloading, are all substantive arguments for choosing the PRONAR T400R Forage Wagon.

Jakub Jarczyński
Pronar Sales Representative

EDITION No. 1/2016

Single-axle trailers

FOR FARMERS, FRUIT-GROWERS AND MUNICIPAL SERVICES

Pronar takes a systematic approach to upgrading its products. The upgrades are sometimes small, but the changes result in, among other things, increased performance and improved working comfort.

One machine that's a real necessity on a farm is a modern, durable, multi-purpose trailer. The growing demand for single-axle trailers with small overall dimensions has prompted Pronar to upgrade its smallest models, the T655, T654, T654/1, T654/2 and T671. With their dimensions, these machines are highly versatile and are used to transport many types of materials, from agricultural products on farms to rubbish disposal by municipal services cleaning parks, greenbelts and bicycle paths, and in horticulture, for transporting crates and collection hoppers between rows of trees and bushes in orchards.

In 2015, Pronar launched a new model, the T654/2 (a modernised T654/1). The PRONAR T654/2 has different upper and lower frames, which reduce the weight of the trailer and increase its load capacity to 4,910 kg (T654/1 had a load capacity of 3,175 kg). The trailer's side walls and joints are made using laser welding technology, with forged hinges and locks guaranteeing a long service life. With the upgrade of the trailer (increasing, among other things, the maximum laden mass to 5,533 kg), there is also a price drop.

The narrow construction and load capacity of 1,800-4,500 kg are key features in the choice of this trailer type. On all our models, the robust side walls, axles and supporting frame guarantee the high quality of

Pronar trailers. The standard model of each PRONAR single-axle trailer is fitted with a central locking system, located at the edge of the trailer bed, which significantly improves operation of the machinery.

The three-way tipping system ensures a high degree of usage comfort and limits the inconvenience of physical work. Another advantage is the wide angle available for side and rear tipping. In addition to the one- or two-pipe pneumatic system, overrun and hydraulic systems are also available. The parking brake, with a crank, is installed as standard, and a lever-operated hand brake as additional equipment. The trailers' functionality is enhanced by additional equipment, such as a profiled ladder attachment that facilitates access to the trailer bed, and strong cords fastening its side walls together. All of

Pronar's single-axle have these features.

Due to their compact dimensions, large load capacity and high manoeuvrability, Pronar's single-axle trailers are particularly useful in horticulture. The low load platform significantly facilitates manual loading and unloading. When choosing new equipment, farmers and fruit-growers are guided, first of all, by competitive pricing and the possibility of continued use after the harvest.

In the municipal sector, Pronar single-axle trailers are used for collecting leaves, branches and mowed grass from parks and green areas. In winter, the trailers are used to transport road grit and help clear snow.

Marzena Piwowarska
Foreign Trade Specialist at Pronar

In 2015 Pronar launched a new model, the T654/2



EDITION No. 1/2016

PRONAR T663/2 trailer on the Uruguayan market

SUCCESSFUL LAUNCH

Extensive promotional activities for Pronar machines in Uruguay have been successful in attracting the interest of many new potential customers. Enough orders were placed between March the 16th and 19th at the Expoactiva agricultural trade fair, close to the city of Mercedes, to establish the PRONAR brand on the Uruguayan market. The PRONAR T663/2 trailer was of particular interest to our new customers there.

The T663/2 trailer, with its tandem suspension and 7,000 kg load capacity, was perfectly suited to the needs of the Uruguayan farmers. The possibility of increasing its functionality with optional equipment, to fulfil their needs to the greatest extent, was also very positively assessed.

This model, apart from hydraulic or pneumatic brakes, can be also fitted with overrun brakes, which was appreciated by owners of older tractors, which frequently don't have hydraulic system connectors for the tractor's braking system.

Operation of the T663/2 is facilitated by a standard ladder, side-wall steps and hopper window, located in the rear wall of the trailer. These details, which are often overlooked, significantly simplify operation of the platform, access to its interior and

unloading of transported material.

On the South American markets, the essential criterion in selecting new equipment is its performance. Machines manufactured overseas and transported to South America in shipping containers for a month or more are exposed to extreme temperatures and are in permanent contact with salt spray, which penetrates the smallest gaps. The anticorrosion protection system and protective painting process used on the PRONAR T663/2 protect against both these risks.

The PRONART663/2 is also perfectly tailored to handling the diversity of crops, i.e. sorghum, yams, rice, soya and sugar beet, from European fields. Therefore, transport of these crops by Polish trailers is also no problem.

Adam Czerka
Foreign Trade Specialist at Pronar



PRONAR T900 Trailer

MANOEUVRABLE GIANT

The T900 trailer, with its sliding front wall, is one of the largest machines manufactured by Pronar. It would appear that the vehicle's maximum permissible loading weight of 33 tonnes makes it a difficult to control giant, but nothing could be further from the truth.

This robust trailer has a loadable volume of 36,57 m³. Thanks to easily mounted 400 mm or 500 mm attachments, available as additional equipment, the volume can be increased to 46,37 m³.

Exceptional stability of the trailer is ensured by its active steering system. In a very short time, using a pump located on the left-hand side of the machine, operators can tension the steering system, open closing valves located behind the pump, and after a few metres of travel straight ahead, the trailer sets the steering axle straight. The operator doesn't even have to use a steering lock. Regardless of the trailer's load level, smoothness of movement on the road is maintained. Even sharp turns pose no problems, as the trailer follows the tractor precisely. In particular, the front (steering) and rear axle are very helpful here.

Another advantage of the PRONART900 trailer is the opportunity for purchasers to choose a mechanical or hydraulic suspension. The hydraulic suspension ensures smooth operation without unnecessary vibration in the platform while driving on uneven or quaggy terrain. When driving without load, the first axle can be raised and the trailer towed as a typical tandem, i.e. with reduced rolling resistance and lowered fuel consumption.

The power push function of the sliding wall is designed for work



with any loads, from grass and grain to heavy materials, such as gravel and earth. During transport of silage and grass, the sliding wall presses the transported load in, allowing the transport of larger amounts of green forage. On construction sites, the two actuators that do the pushing on the front wall, ke-

eping massive loads rearwards, are indispensable.

The T902 is basically the same model, but with a smaller load capacity. It retains the tandem-axles of the larger T900, and perfectly complements Pronar's range in this segment.

Jan Kukliński
Foreign Trade Specialist at Pronar

PRONAR T046/2 Animal transport trailer

TRANSPORT WITH LESS STRESS

The PRONAR T046/2 is a specialist trailer intended for transport of animals over short distances. The design includes essential advantages, which facilitate efficient loading and unloading of animals.



These include large, double-leaf doors and a hydraulically-operated loading platform. The trailer's front is fitted with a tilt-and-turn door for free access to the transported animals.

The PRONAR T046/2 is characterised by a relatively low weight-to-load capacity of 12 tonnes of the maximum permissible mass, which equates to about 10-12 animals. Due to the tandem axles and wide tires used, the T046/2 can also be used on wetland as well.

The trailer is equipped with a tarpaulin frame and linking crosspieces as standard. A further practical solution, offered optionally, is installation of a laced tarpaulin.

Animal handling is supported by a one-piece internal partition to separate transported animals, which can be mounted as an optional accessory. Other elements of additional equipment include side railings facilitating the loading of animals, a hydraulic scissor drawbar

stand with cut-off ball valve, and a floor made of riffled sheet metal with an anti-slip cover made of a damping, synthetic resin. Open drain outlets also make floor cleaning much easier.

The PRONAR T046/2 trailer is made of the highest quality materials, which give it a long service and guarantee the safe, comfortable transport of animals.

Marta Kuligowska
Foreign Trade Specialist at Pronar

Pronar hook lift trailers in Western Europe

ONE INSTEAD OF MANY

Pronar hook lift trailers, with their versatile functionality, are being increasingly used in the domestic agriculture sector. Now, they're also finding a home amongst farmers in Western Europe.

Pronar is a long-standing manufacturer of hook lift trailers, which have gained very good opinions from users in Western European countries. The basic advantage of Pronar's hook lift trailers is their multi-functionality. The purchase and maintenance costs of having to have several types of trailers, with different load capacities, are much higher than the purchase and maintenance costs of having one multifunctional hook lift trailer with matched containers. Due to their versatility, hook lift trailers can be used in two ways: to transport containers, or when a hopper is installed, as a standard dumpster.

Farms in France, for example, traditionally use a variety of monocoque trailers with different load capacities. However, farmers there have been increasingly deciding to sell them and buy hook lift trailers with a set of containers. Replacement of worn containers is much cheaper than replacing an entire monocoque trailer. And a very large number of farmers work not only in agriculture, but

also in road-building, where hook lift trailers also find extensive use.

In Switzerland, hook lift trailers are successfully replacing drop-side trailers. "If a client needs a multi-purpose hook lift trailer with a container, he chooses PRONAR", says Nicolas Jaquet, PRONAR's brand distributor in Switzerland. "This is a result of their solid design and good finishing quality. Strong weld seams confirm that high quality."

All these factors build trust in the PRONAR brand, while a proper price-to-quality ratio is also important, which in the case of Pronar hook lift trailers is unbeatable.

Pronar's designers have continually improved the range, and developed new types of hook lift trailers. Pronar's catalogue includes the T185, T285, T285/1 and T286 double-axle hook lift trailers. The newest model is the triple-axle PRONAR T386 hook lift trailer.

Katarzyna Kurasz
Foreign Trade Specialist at Pronar



PRONAR trailer T185



PRONAR trailer T285



PRONAR trailer T285/1



PRONAR trailer T286



PRONAR trailer T386



Monocoque trailers

TESTED, ROBUST, CAPACIOUS

Monocoque trailers are ideal for farms that – with the demands of agricultural production, materials handled and existing trailers (usable with medium and high power tractors) – require practical solutions to transporting a variety of materials. If we add to this robust and rigid construction, particularly essential while operating on uneven terrain, it is clear that monocoque trailers best fulfil the criteria for machines on such farms.

The PRONAR T669 and PRONAR T669/1 monocoque trailers feature large load capacities (23 m³ – with attachments, 580 mm tall (T699); 28 m³ – with attachments, 1 m tall (T699/1)). Furthermore, their closed profiles ensure the durability of their construction and high resistance to deformation. The high manufacturing precision of their load beds also gives them a level of tightness sufficient to transport even fine grain. Additionally, the optional three-way tipping system further increases the functionality of these trailers.

In turn, the seamless finishing of the interior bed of the T679 trailer guarantees that transported agricultural products remain undamaged. Its extra attachments, hydraulically-raised tailgate and grain hopper hatch make working with the T69 highly efficient.

The model T679M (an upgraded T679) is fitted with, among other things, an improved load bed with sidewalls made of single metal sheets (without a central rib). This gives it a modern design and high strength parameters. The rubber seal, which

part of a wide array of standard features, ensures 100% tightness of the construction. The other standard elements of the PRONAR T679M trailer include front and rear mudguards, twin-pipe pneumatic braking system, side ladders and steps, a large hatch in the front wall, side lighting and a scissored-drawbar stand.

The model T700, with its Tandem chassis, is the largest monocoque trailer manufactured by Pronar. Its distinctive features are a steering axle for better manoeuvrability, and sprung drawbar for improved work-



PRONAR T700



PRONAR T669/1

ing comfort, particularly under high loads. The functionality of the PRONAR T700 is enhanced by the hydraulic tailgate and automatic locking.

The T700M is the upgraded version of the PRONAR T700. Its maximum laden mass is 23 tonnes (a constructional load capacity of 17,000 kg). The highly durable Tandem type suspension with parabolic leaves, 150 mm diameter-axles and drum brakes is designed to operate at a maximum speed of 60 km/h. The tailgate of the T700M is fitted with a system of locking mechanisms based on hydraulic cylinders. This guarantees proper security of the locks and prevents the tailgate of the trailer from being accidentally opened. The T700M is the best-equipped PRONAR trailer in the standard version. And both it and the T700M are characterised by the highest load capacities of all Pronar trailers with Tan-

dem type suspension, amounting to 35 m³ (with optional attachments).

Pronar also manufactures a monocoque trailer with a Tridem suspension (with backward tipping) – the T682. Its drawbar (mounted on the lower frame) and the frame of the loading bed are made of advanced, high-strength rectangular steel sections. These guarantee the rigidity and stability of the trailer, even with the optional 580 mm sidewall attachments that increase its capacity to 32 m³.

Sylwester Zagulski
The author is Foreign Trade
Specialist in Pronar



” Pronar manufactures the following monocoque trailers with Tandem type suspension: T679, T679M, T700, T700M (with backward tipping); the T669/1 (with two- and three-sided tipping), and the T669 (with one-sided tipping). Pronar also manufactures the T682 with a Tridem type suspension and backward tipping.

PRONAR T679/2 and PRONAR T701 Trailers

SOLID AND FUNCTIONAL

In addition to drop-side agricultural trailers, Pronar also manufactures monocoque trailers. Among others, these include the PRONAR T679/2 and PRONAR T701. These are designed to operate under the most difficult conditions, maintaining functionality and satisfying the expectations of the most demanding customers.

The wide range of uses for PRONAR T679/2 and PRONAR T701 trailers testifies to their functionality. These machines are particularly well appreciated by our customers from the Scandinavian markets, for whom the manufacturing quality of Pronar products is one of the most important selection criteria. But the T679/2 and T701 are ideal for all customers looking for a versatile trailer that can be used to transport various types of loads, including machinery.

The T679/2 and T701 are fitted with a tub-shaped trailer bed. Their floors are made of 10 mm thick sheet metal, with 8 mm walls, allowing them to transport heavy loads, such as debris, stones, gravel or sand. Optionally, at the customer's request, the trailer bed can be made of wear-resistant

sheet metal, so the trailers can be used for the heaviest work in the municipal sector, the construction industry, heavy industry or road-building industry. With a hydraulically-controlled tailgate installed in the trailers, construction and road equipment can be easily loaded and transported.

The PRONAR T679/2 and PRONAR T701 can also be used for many different jobs, because of their overload-resistant construction. The chassis frames are made of closed, rectangular profiles that can accommodate combined loads, which in particular affect the trailer operating on difficult terrain.

The robust chassis composed of parabolic leaves, two driving axles and wheels with deformation-resistant tyres, give the T679/2 trailer



PRONAR T679/2



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Øyvind Tofteber, a Norwegian farmer from Svinndal (Våler community, Østfold region)

- I've used the PRONAR T679/2 trailer under various conditions for many years now. Its solid performance means I can work without worrying.

its maximum permissible gross laden weight of 16,350 kg, and the T701 its 24,000 kg.

Both the T679/2 and T701 have a wide assortment of equipment fitted as standard. The multi-purpose trailer drawbar can resist very high loads, even up to 2,000 kg in the T679/2, while the T701 can handle up to 3,000 kg. It can be connected to the upper or lower hitches of the tractor, and it is also possible (according to customer needs) to use various eye-hitches. Additionally, the drawbar of the T701 is cushioned by a longitudinal steel spring, which ensures high operational safety.

The PRONAR T679/2 and T701 trailers are ideal for people who expect functionality and reliability from a product in all kinds of work, agricultural and municipal.

Łukasz Wąs
Foreign Trade Specialist at Pronar

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TECHNOLOGIES

The PRONAR MazurPlus Twin-wheel system

SAVES SOIL

The twin-wheel system used in agricultural machines is similar to, and fulfils the same function as wide, low-pressure tyres. Both aim to reduce pressure on the soil, and both have their supporters.

The MazurPlus system, developed by Pronar, is based on the classic twin-wheel system. The advantage of the PRONAR MazurPlus, compared to other twin-wheel constructions, is that the additional wheels can be easily removed. This means the operator's tractor can be quickly adapted to different jobs. The twin-wheel MazurPlus system consists of two U-shaped sections with variably-sized connections, a levered nut and an extended coupling bolt.

Pronar's range includes increasingly larger and heavier agricultural tractors. This is why it has become so important to protect soil against excessive compaction, which damages its structure. The solution, then, is not only to use broad tyres (also offered by Pronar), but also

twin-wheel equipment. These can be inflated to as little as 0.8 bar (0.08 MPa). Twin-wheel systems ensure far greater surface contact with the ground, so the pressure on the soil is lower and the job of the pull force of the tractor is greater. The twin wheels reduce slippage and the resulting increase of the pull force.

With twin-wheel systems, including the PRONAR MazurPlus, agricultural jobs can be completed within optimum time limits, even under high soil moisture conditions. The two sets of wheels may prove the only solution in marshy terrain, and can also be successfully used with tractors for pressing ensiled forage into open-ended silos. In this case, the twin-wheel systems are recommended, not only because they

speed up the pressing process, but also because damage to the pressed mass is lessened.

From the point of view of the practical user, the most important thing is that the use of twin-wheel systems limits water evaporation and reduces surface water outflow through guide traces and ruts by up to 50%. In addition, with medium-heavy and heavy works, wheel slippage is reduced by 30% (with ideal tyre pressure); therefore, fuel consumption is also decreased. And because the soil is pressed less, the necessary expenditure on soil reworking is lowered as well. Use of twin-wheel equipment as early as during pre-sowing and sowing also creates savings. Our customers' experiences clearly show significant savings on fuel consumption.

The twin-wheel PRONAR MazurPlus system is easy to install and remove. Its main advantage is the fact that it requires only two tyres and a separate coupling. As described above, the entire assembly consists of two U-shaped sections with variably-sized connections, a levered nut and an extended coupling bolt.

The most important components of the system are the two U-shaped sections with variable connections. Three pairs of holes with different spacing, located along the sections, mean the MazurPlus system can be adjusted to fit wheels with holes spaced at 205 mm, 275 mm and 335 mm. Upon request, an adapter is available for wheels with



hubs protruding beyond the plane of their rims. The holes in the U sections will need to be drilled up to the required diameter, with the factory-standard being 15 mm.

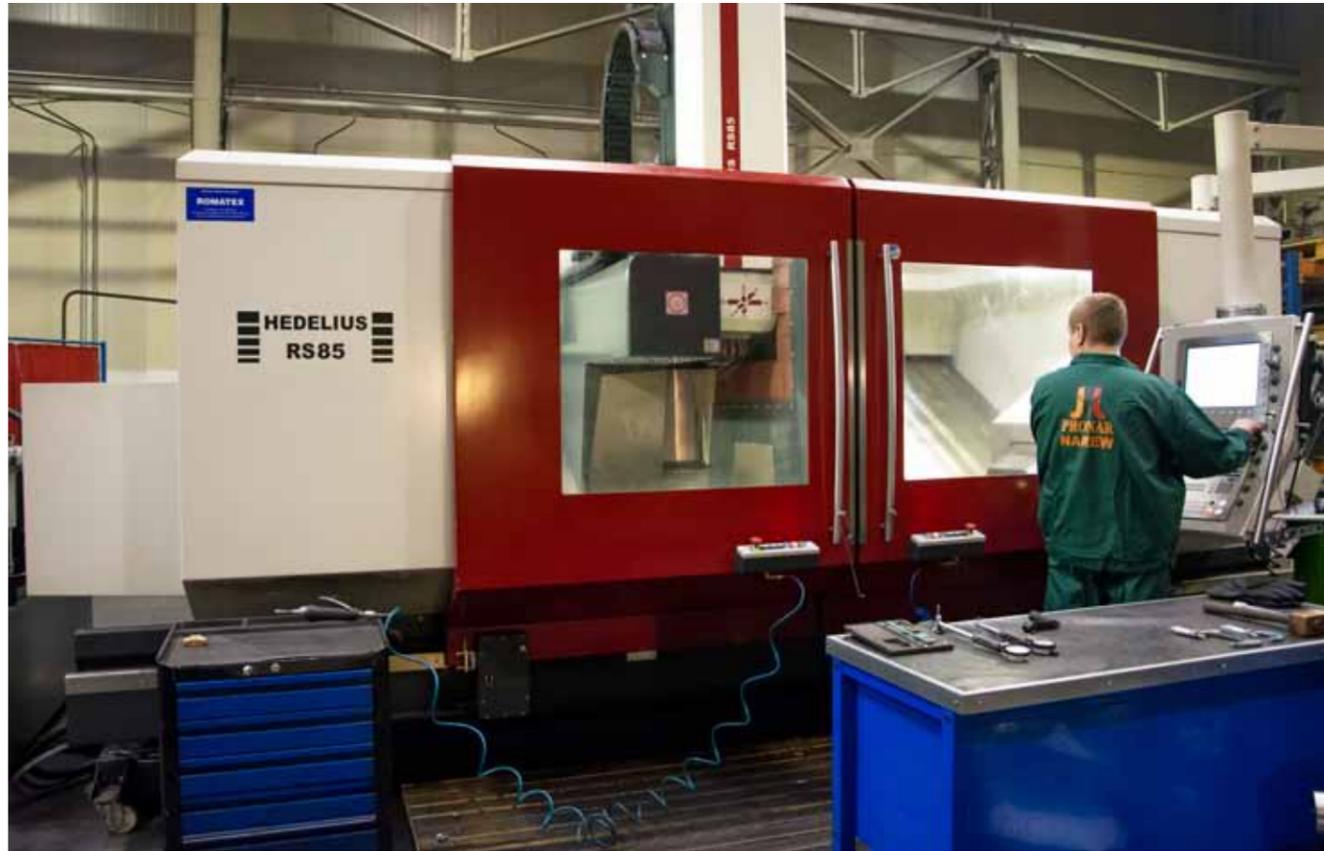
The next component of the system is the levered nut. Lateral arms welded to the nut make the entire assembly easily mounted and dismantled without the need for additional tools. The centrally-located bolt has a length of 1 metre, and precisely connects two wheels. The coupling ring and two pairs of wheels are also necessary for correct installation of the twin-wheel set, and are also available from Pronar. The coupling rings are available in widths of 200, 250 and 300 mm, with the sizes of from 24 to 42 inches.

Buying a MazurPlus system from Pronar, you will get expert advice on selection of other components of the system, such as tyres and coupling rings. We can then be sure that all of the components of your twin-wheel MazurPlus system are correctly fitted and that the entire assembly will be fully operational.

The detailed technical parameters of the twin-wheel PRONAR MazurPlus system and additional information (in English, German, Russian and Polish) on appropriate selection of sub-components is available at www.pronar.pl

Paweł Dworakowski
Foreign Trade Specialist at Pronar's Wheels
Department





Pneumatics and hydraulics

HIGH QUALITY AND LOW PRICES

Technologically advanced machinery, highly qualified personnel and use of new software all lie behind the constantly expanding product range of the Pronar Pneumatics and Hydraulics (P&H) Department.

The P&H Department manufactures pistons, plungers and telescopic actuators, as well as rigid and flexible hydraulic pipes, ends, connectors and compressed-air reservoirs. Pronar is also one of the few manufacturers in Europe manufacturing telescopic double-acting actuators.

With scrupulous attention to quality at every stage of the production process, work conducted according to ISO 9001:2000 and the efforts of the P&H Department's design and technology office, all orders are handled quickly and efficiently.

In addition to the standard designs, the department also fulfils individual orders for innovative products with a high degree of complexity.

The P&H Department's products are installed in Pronar machines and delivered to a wide variety of European customers. These products are used in many industrial sectors, including in modern construction, agricultural, forestry and municipal equipment. Up-to-date manufacturing technology produces high-quality results at the lowest possible production costs, which translates into gre-

at prices for customers. The P&H Department's design and technology office works closely with the Sales Department to complete even the most complex or non-standard orders. Production of a customer-specific actuator, for example, is supervised by the Quality Control Department according to the customer's parameters. If any non-compliance is detected, the entire production is stopped and the products subjected to 100% checking and testing.

Konrad Kłoskowski
Foreign Trade Specialist in Pronar's
Pneumatics and Hydraulics Department

Spare parts distribution

FAST, CHEAP AND PRECISE

The efficient distribution of spare parts is one of the key factors in gaining repeat purchases of brand-specific machines. Pronar's Sales Departments have a saying about this: 'The first machine is sold by a salesman, the next by the customer service department'. So Pronar attaches great importance to the proper functioning of its customer service teams, as well as the availability of spare parts.

Through its dealership network, Pronar distributes spare parts for its products all around the world. The company's central warehouse contains more than 40,000 assorted parts, ensuring the completion of service repairs within the shortest possible time. Orders to the Spare Parts Department can be placed by fax, email or telephone. The Department's priority is meeting customer expectations, which are fulfilled through expert advice, and technical and logistic assistance. Buying from Pronar means customers can be sure that their service repairs use only original parts that have been checked and are covered by guarantee.

One of the most efficient options for parts distribution is 24-hour delivery within the European Union. If an order is placed before 12 noon (GMT+1), the customer will receive it within one working day. The Spare Parts Department's personnel will inform the customer of the delivery costs by phone or email. In addition, the shipment can be monitored through the carrier's website. If the delivery time of the spare parts is known, work can be reasonably planned. For example, farmers forced to stop work while bailing due to a machine failure can find out how long it will take to get the part, and arrange a mechanic in due time.

Pronar also offers the 'Delivery with machinery' service. This is

a good way of shortening delivery times and lowering costs. This concerns large-scale shipments, e.g. side-walls or trailer frames. Customers can visit one of over 200 Pronar dealers and place an order, for example, for an additional set of trailer attachments. Then, their shipment will be included with the dealer's regular delivery of machines and devices. These deliveries are made by the Pronar Transport Service.

The Spare Parts Department is run by highly qualified employees, who – due to their syste-

matic training – are constantly improving their skills. Each order placed with them is fulfilled quickly and accurately. The speed of the shipment of parts is a result of their close cooperation with the Central Warehouse. Speed and accuracy are very important in customer relations. They help customers build trust in the Company, and in particular, consider another purchase from Pronar in the future.

Marek Mirończuk
Information and Customer Service Specialist
at Pronar



Pronar following world economic trends

TECHNOLOGY AND WORK ORGANISATION

Observing trends in the world economy, we can see price competition between manufacturers and suppliers. To continue their work together, the manufacturers consequently require the suppliers to reduce their prices while maintaining the quality of the products they supply. Subsequently, the suppliers are forced to look for savings from their own business partners.

Pronar introduces new technologies that shorten production periods and reduce costs. Cost reductions are sought in various areas, including in the selection of production components, which allows us to lower their prices while maintaining the previous quality.

It's obvious that to gain new customers, one of the basic conditions that must be met is to offer the lowest price possible, for the highest quality and reliability of the product possible. To achieve this, we use the latest technologies that shorten the production process. Pronar's technological lines are fitted with equ-

ipment facilitating the work and boosting production efficiency. This applies to the whole enterprise, including the Axle Production Department, where to enhance efficiency and achieve lower production costs, the lengths of the production series are extended as far as possible.

To maintain the high quality of the axle shafts, axles and suspensions, monitoring is also necessary throughout the entire process – starting with the materials from the suppliers (steel, standardised components, nuts and bearings etc), and ending with each main production phase, e.g. machining, welding, as-

sembly and painting. After these, detailed quality reports allowing product identification are drawn up. And when the smallest production error is found, it is identified by the person performing the specific action. In this way, the reason for the fault can be easily determined. Each fault is analysed in detail, and as a result corrective actions are undertaken in the specific area of the manufacturing process.

Quality is also affected by the use of modern production machinery, for example machine tools and other precisely controllable equipment. One example is the Axle Pro-

duction Department, which runs a production line for pivots. The line is fitted with a control and measurement stand. Each component manufactured is transferred, by means of an automatic feeder, to an automated measurement table. If any parameter exceeds the programmed tolerances, the appropriate signal is sent to the machine tool, which automatically corrects the dimensions in subsequent production.

In addition, upon completion of each one manufactured, the axles are subject to detailed quality control. Every axle type is accompanied by specific instructions, which determine the methods of the final checks to be made and the relevant parameters.

Using their own experience as well as research conducted together with external institutions, Pronar's engineers have designed a special stand for axle tests. Consequently, new products can be implemented much faster and can be eliminated at the stage of prototype development.

And based on analysis of the results, the designers can determine where and what should be changed or corrected, to make the final product operate more smoothly and obtain final approval for use. This stand is used to carry out braking tests, whose results allow for conclusions to be drawn on quality, strength and other technical parameters of the tested axle components.

Pronar has implemented the PN-EN ISO 9001:2009 quality management system. This standard is accepted and recognised all over the world, and ensures the traceability and repeatability of production, ensuring the high quality of all Pronar's products

Andrzej Omelianiuk
Axle Production Department
Manager at Pronar



Using their own experience as well as research conducted together with external institutions, Pronar's engineers have designed a special stand for axle tests





Side profile production and sales

120% GROWTH

Pronar has manufactured side profiles since 2012. During these almost four years, the fast-growing department has become a flagship part of the company.

The Company's well thought-out strategy for implementing new products has proved a success. This is due to short order completion times, the very high quality of the profiles manufactured by Pronar, and competitive pricing. Since 2012, Pronar has successively increased both its domestic and foreign sales share. At present, Pronar is a leader in sales of side profiles in Poland and a significant supplier to many European markets.

Compared to the previous year, the 2015 sales of Pronar profiles increased by 120%, and the Company's working relationship with most

Polish manufacturers of agricultural trailers and semitrailers was developed. Pronar began deliveries of side profiles to Belarus, Bulgaria, the Czech Republic, Germany, Ireland, Lithuania, Russia, Slovenia, Turkey and Ukraine. During last year's Agro-technica trade fair in Hanover, Pronar products attracted great interest from manufacturers of agricultural machines, and not only from Europe.

The market success of Pronar profiles results from the involvement of the Side Profile Department's employees, their care for the highest manufacturing standards, professional brand-building and accurate

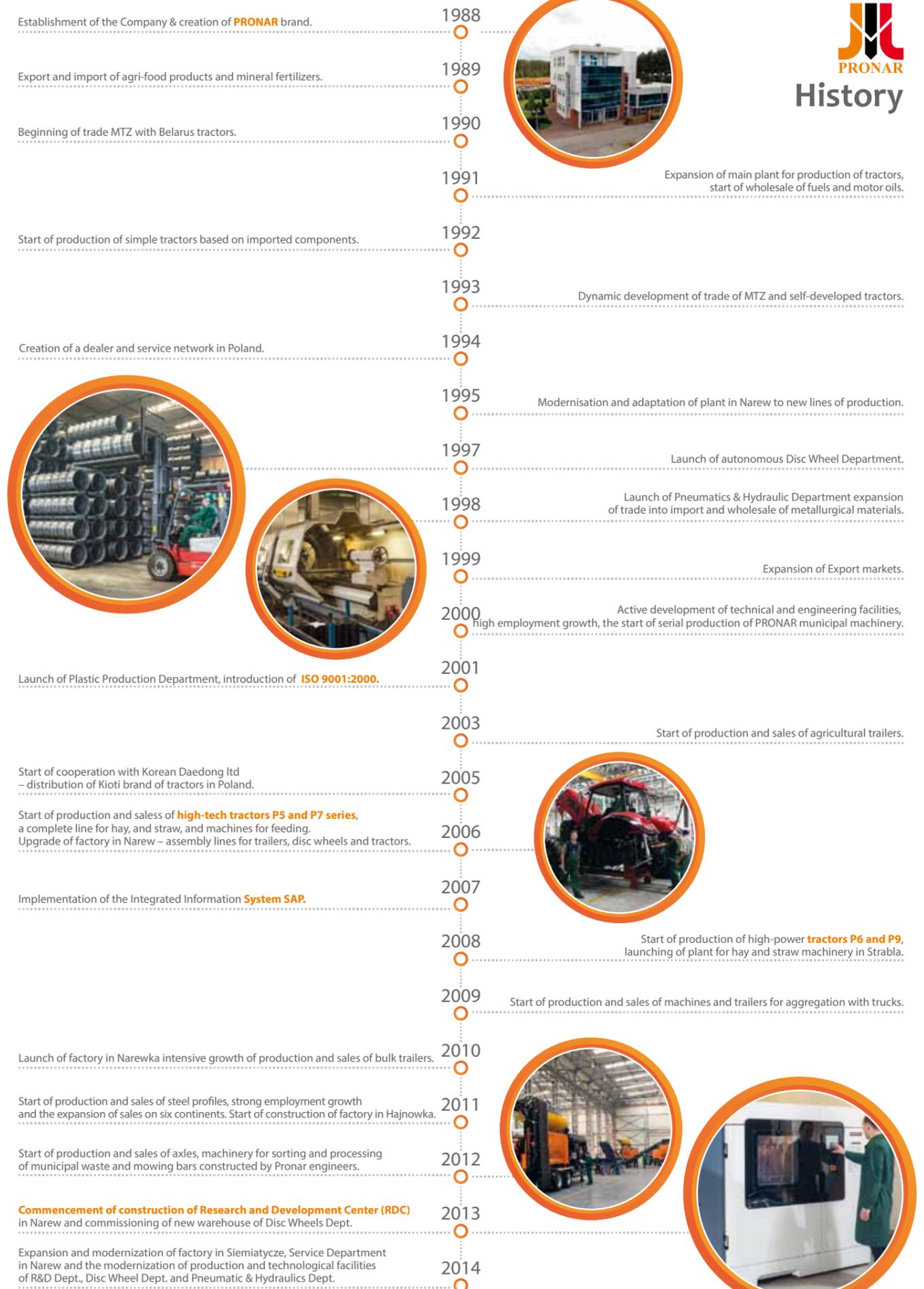
reporting of all information to interested parties.

In 2016, the Side Profile Department's employees are facing great challenges, with a planned doubling of trade and a permanent increase in the number of its customers. Their permanent priorities include development of the range of profiles on offer, and improvement of the production process to make the quality and prices of their products as favourable as possible for customers.

Mariusz Grygoruk
Trade Specialist at the Pronar Steel Warehouse



History





Plant No. 1 Narew



Plant No. 2 Narew



Plant No. 3 Narew



Narewka



Strabla



Siemiatycze



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