

*The effective technology
and complex services*

Farmet[®]

OIL & FEED TECH

OIL & FEED TECH



HEXANE FREE
TECHNOLOGIES[®]

COMPANY INTRODUCTION

*The effective technology
and complex services*



The company Farmet a. s. is a dynamically developing Czech company involved in the development, production, sale and service of agricultural machines for soil processing, sowing and technologies for processing of oilseeds, vegetable oils and feed extrusion.

The brand Farmet is aimed at products of high quality and high utility value that are globally competitive and used in high-productive agricultural and processing operation.

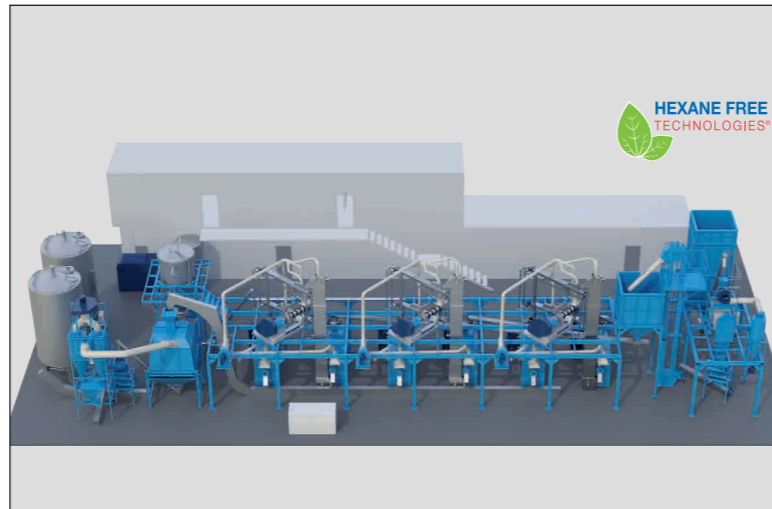
Our motto:

The effective technology and complex services.

Main fields of activity:

AGRICULTURAL MACHINERY – development and production of agricultural machinery for soil processing, fertilizer application and sowing.

OIL & FEED TECH – technological equipment for processing of oilseeds, gaining and processing of vegetable oils, production and extrusion of feed and feed mixtures.

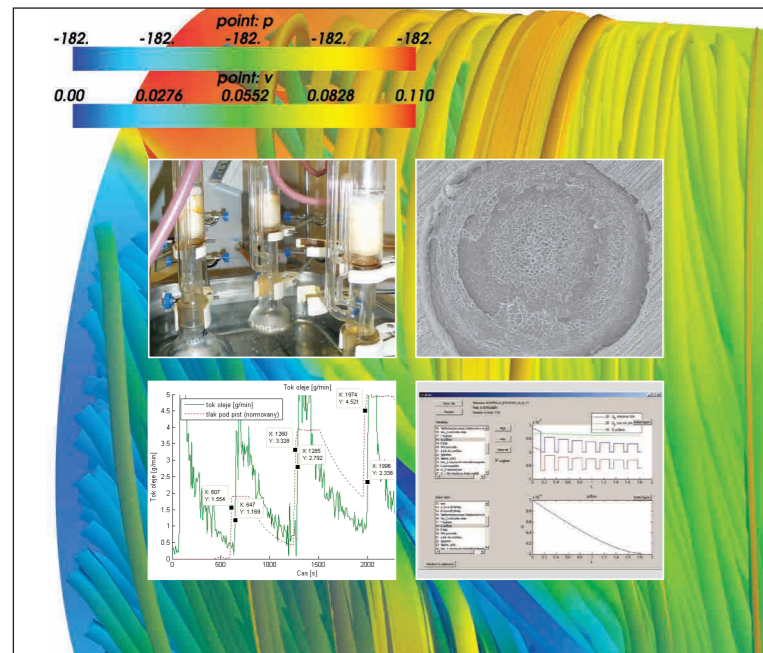


RESEARCH & DEVELOPMENT, EDUCATION

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- **We optimize processes and develop machinery and equipment so that the customer gets high effectiveness at minimum costs.** We systematically analyze processes and events that occur during the pressing of oilseeds.
- **We employ results of our own research and development.** As a result, the technology we deliver meets both our customer's technological and economical requirements.
- During the development of new machines, **we focus on environmental friendliness.**
- **We cooperate with important research institutes and universities around the world.**

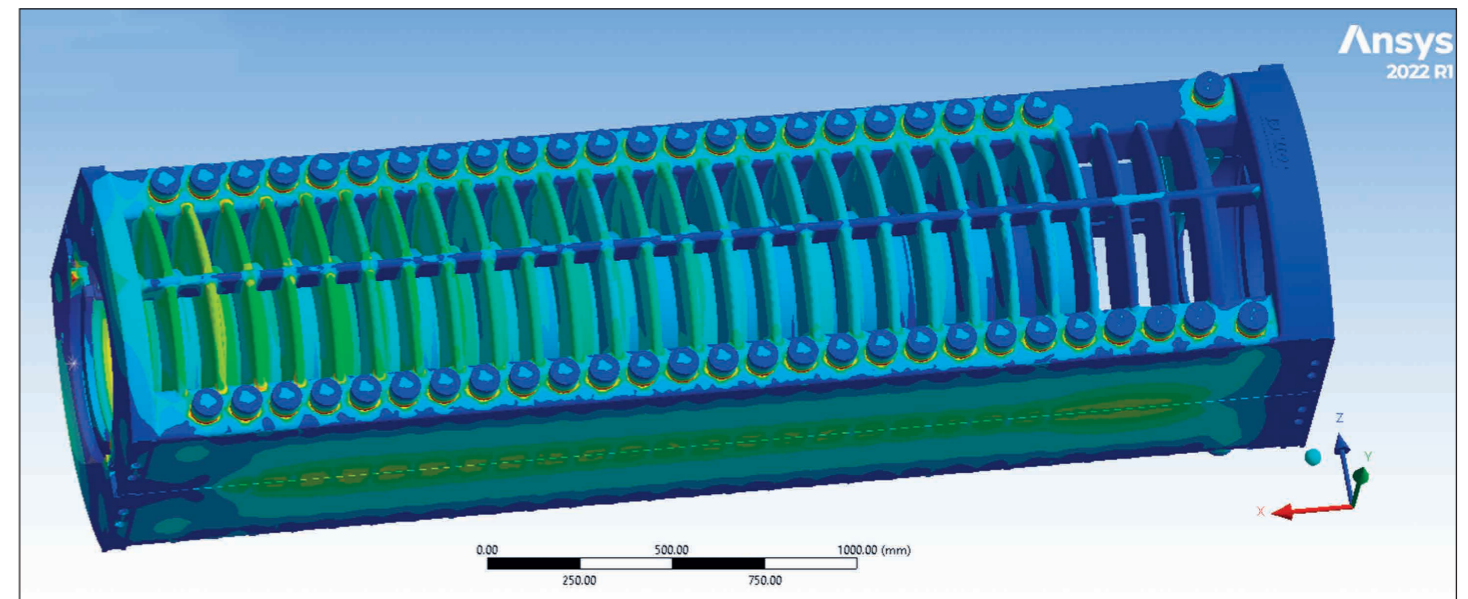
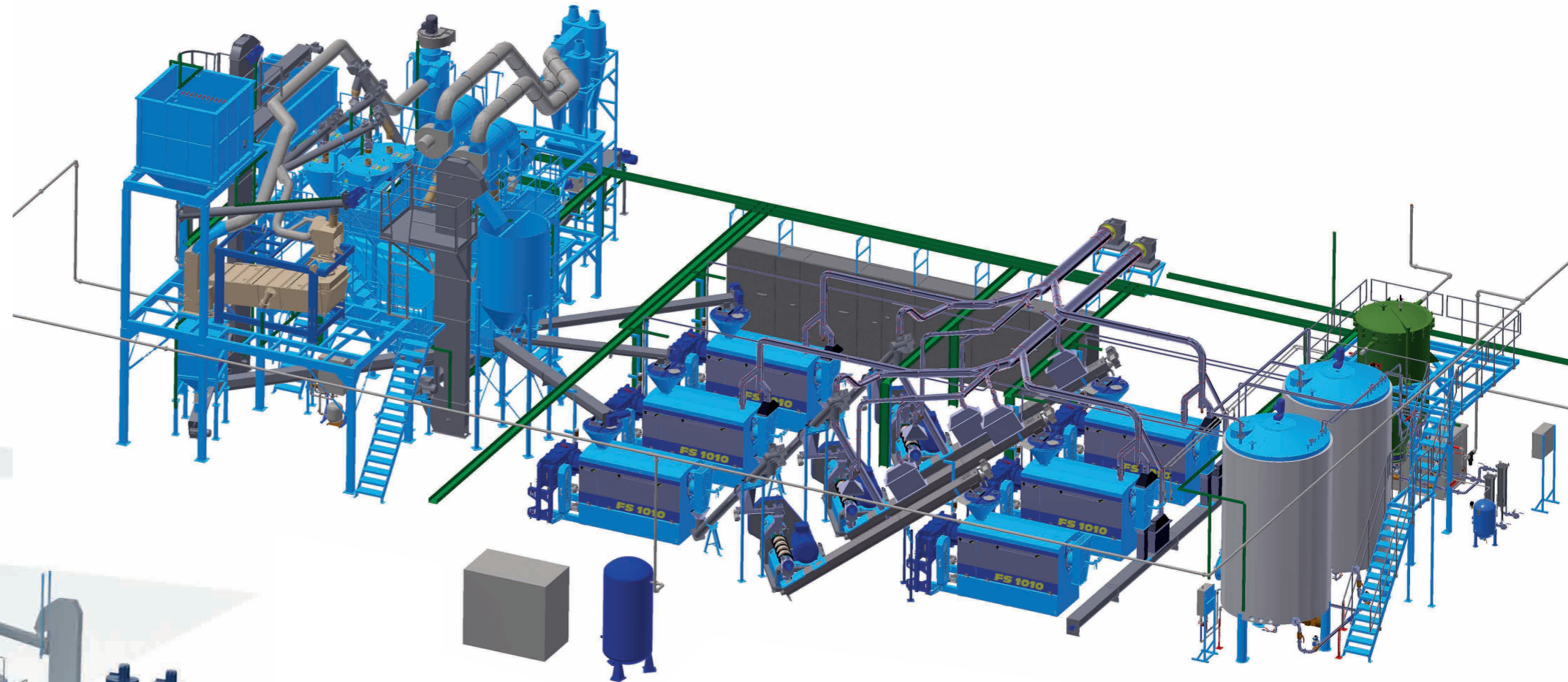
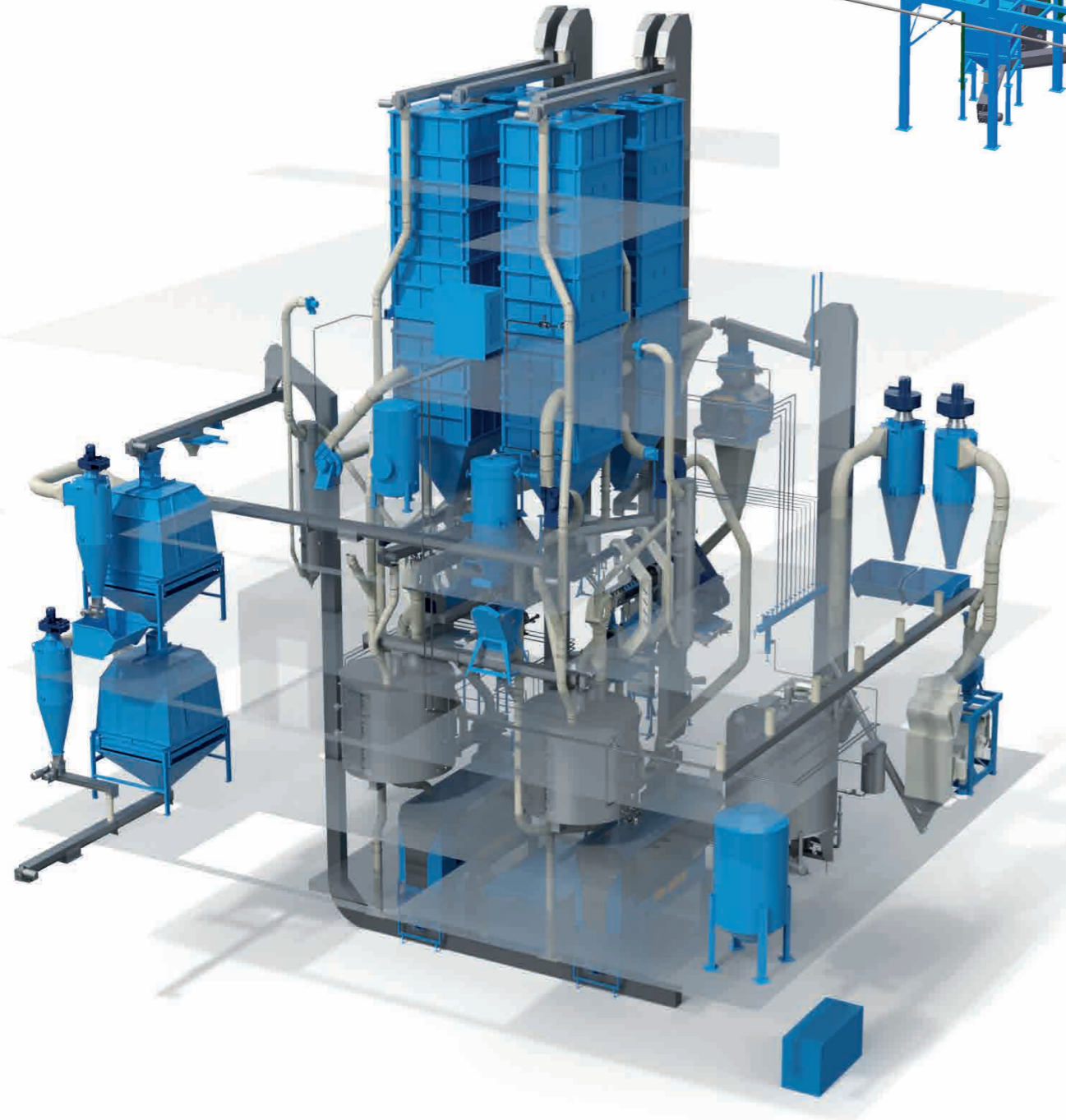
- **We analyze properties of each oilseed species and variety and design optimal solutions for their processing.**
- **We study the unique rheological properties of pressed materials** and simulate the processes that occur during pressing.
- **We apply the results of R&D into practice and perform tests in our own laboratory.**
- **Our analyses of oilseeds, press cakes and oils are carried out in our own laboratory with the use of state-of-the-art analytical tools.**



DESIGNING, CONSTRUCTION

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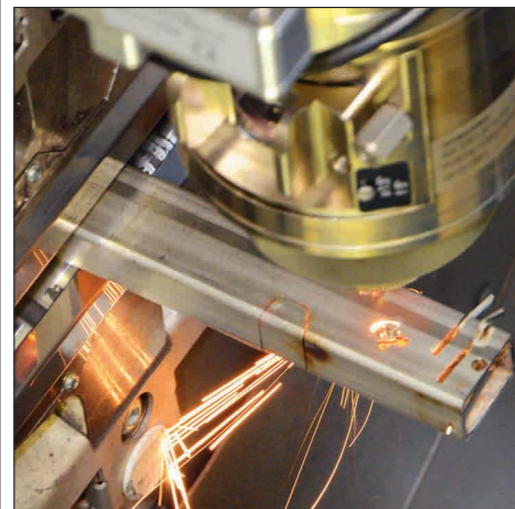
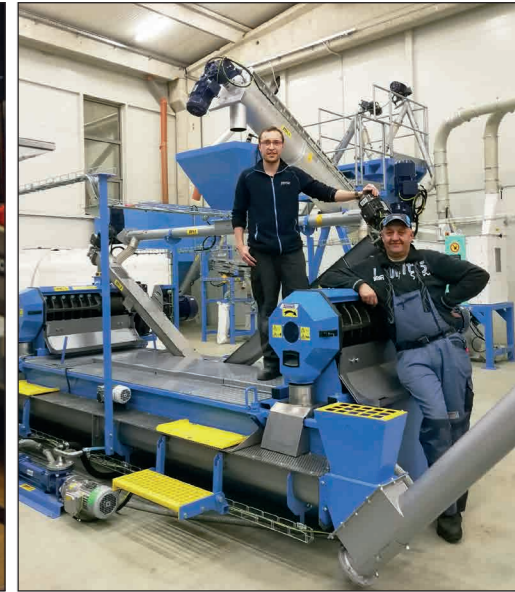
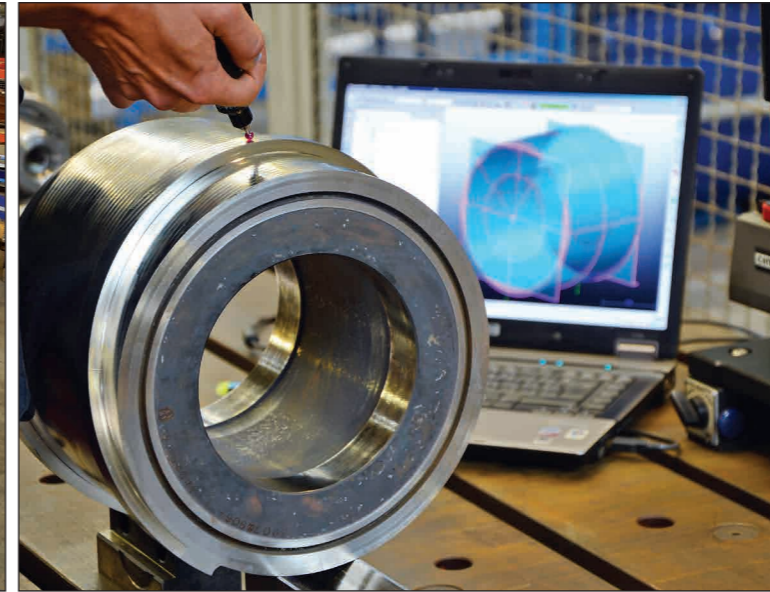
- Based on our long-term experience we provide complex design services in the field of technological equipment.
- Within our design services we offer all stages of project design documentation, i.e. from a preliminary study to the documentation of actual state.
- Our design team develops advanced technology and guarantees commitment to world-class parameters. We fully employ findings of our R&D department. During the entire process we intensively communicate and cooperate with our customers and implement their wishes and requirements. We also provide consulting services.



PRODUCTION, CUSTOMER CARE

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- **Investments into state-of-the-art production and measurement technologies** and mastering of their operation allow us to offer optimal solutions at reasonable prices.
- **Extended service life of our components and their potential for renovation** are secured with the technology of armoring of the working parts of the screw presses.
- **Our own production facility gives us more flexibility when fitting the delivery to a particular customer's requirements.**
- **Key machinery and equipment used in Farmet technologies are manufactured in our own factory.**
- **Quality – one of the highest priorities in our company – is a cornerstone of our work.**



- **Quick, effective and complex solution to individual customer's needs all over the world** (on-site, online consulting, remote control).
- **Assembly, chief assembly, putting the technology into operation. Training of operating staff.**
- **Guarantee of parameters.**
- **Innovation of existing equipment in order to increase effectiveness** (e.g. pressing shop reconstruction).
- **Guarantee and after-guarantee service.**
- **Wide network of service and sales representation all over the world.**

■ **Technological installation guide.**

- **Direct consulting with the responsible Product Manager** via the Technical Support Centre (service desk, prompt service emergency).

- **Technology diagnostics. Planning of spare part replacement.** Overhaul of existing parts.

Control and automatization

- **Easy control and visualization of technological processes** (Farmet Intelligent Control). We have designed optimized control algorithms for the individual project sections and technological operations.

Technology management

- Control, optimization of the entire process in order to achieve the best final product quality.
- Evaluation of operating parameters and data from external sources. Optimal settings in terms of quality of output products.



COMPLEX OILSEEDS PROCESSING

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- **Thanks to the unique combination of our complete portfolio of oilseed screw presses and feed extruders, we highly recommend you the exclusive technology of Pressing with Extrusion.** This combination of both technologies will ensure you the best results for the processing of soybeans, rapeseed, sunflower seeds and other oilseeds (e.g. ricin).
- **Oilseeds pressing plants technology produced by Farmet company stands on long-term experience in this field.** This technology includes highly efficient screw presses in various configurations, which are always optimized for the specific application and **maximum oil yield**.
- In oilseeds pressing technologies, only **continuous screw presses** in various configurations and various seed pre-treatments before pressing are used.

- **Lowest operating costs** thanks to Farmet technology, which uses an advanced **patented system of energy recovery**.
- **Farmet's hexane free technology is the most economical and environmentally-friendly.**
- Hexane-free technology Farmet brings you **the ideal feed with the optimal ratio of fat (energy) and proteins**.
- With Farmet's Hexane free technology **you will achieve the most effective feed at the lowest cost**.
- **Complex technology will guarantee you low operating costs.**



**HEXANE FREE
TECHNOLOGIES®**

Pressing with extrusion

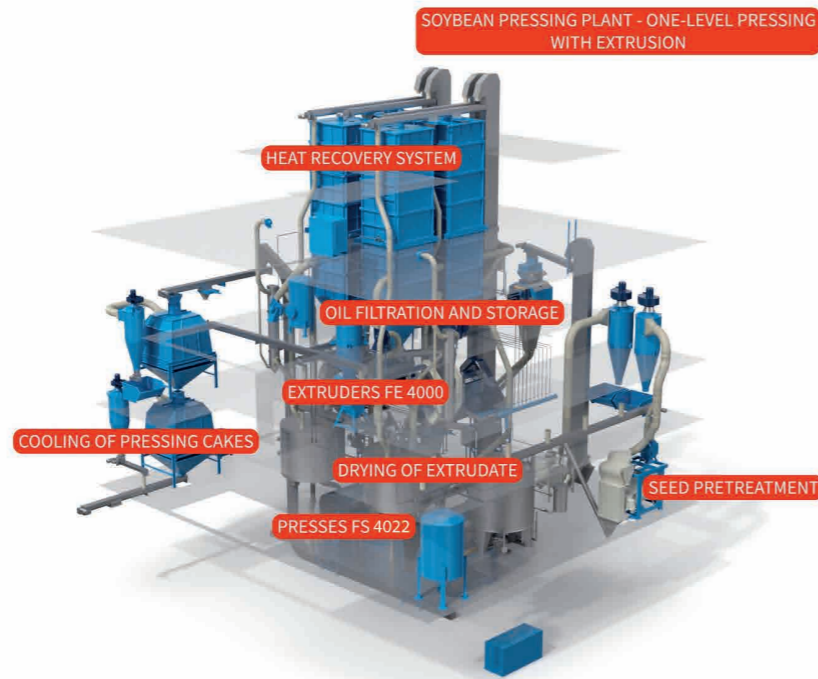
The perfect combination of mechanical and thermal processing. It takes advantage of extrusion in the pressing technology (it allows higher oil yield in subsequent pressing).

Benefits of the pressing with extrusion technology:

- Installation from small to very high capacities.
- Chemical solvents-free, waste-free, environmentally-friendly and energy-efficient technology.
- Possibility to process organically grown, GMO free, hexane free, bio products.
- Press cakes are of a high quality, heat-improved for high energy value - ideal for the purposes of animal nutrition (especially for feed for ruminants).
- The obtained oil is of high quality with a lower content of phospholipids compared to solvent extraction.

The EP1 technology (One-level pressing with extrusion) uses a unique patented system of energy recovery (reduce production costs, increase technology performance and reduce the return-on-investment). One-level pressing with extrusion is a technology that is developed specifically for soybean processing. The combination of extruder and subsequent pressing allows you to obtain **the highest quality press cakes**.

The EP2 technology (Two-level pressing with extrusion) is designed for a wide range of oilseeds with oil content greater than 35%, most commonly rapeseeds and sunflower seeds. This technology takes advantage of extrusion for pressing. The first step is the cold pre-pressing of seeds, then the press cakes are compressed and heated up in the extruder. The expansion at the outlet nozzle breaks the cells, which together with the increase in temperature facilitates the release of oil in the second level of pressing.



PATENTED SYSTEM OF ENERGY RECOVERY !!!

- It uses waste heat to preheat soybeans.
- Significantly increases the performance of the technology.
- Reduces operating costs.
- Increases your competitiveness.
- Shortens the return on investment.

***Example of energy saving:**

Therefore, recuperation significantly reduces the energy demands. The energy cost is the biggest operating cost. For example: Saving 20 kW/tonne in the EP1 RECU technology means a saving of 120 kWh at the technology capacity of 6 t/h. At the energy price of 0.10 EUR/kWh, it means saving 12 EUR/hr, 288 EUR per day, and **that is a saving of 95 040 EUR per year!!! This is a saving of 950 400 EUR over 10 years of operation of the technology, which is almost the value of the basic price of the EP1 technology.**

*** Prices are indicative. It depends on local conditions.**



CP1 – One-level cold pressing

The technology of one-level cold pressing is based on **the use of only one pressing stage**. The technology does not involve mechanical or thermal treatment of the seed before pressing, the seed is directly dosed into the press.



CP2 – Two-level cold pressing

The Two-level cold pressing technology offers a gentle pressing solution while achieving high oil yields. During the pressing process, the oilseeds are not heated too much and the biologically valuable substances are retained, while the oil contains only a small amount of phospholipids, which facilitates further processing.



Cold pressing

Cold pressing is a process without preheating the oilseeds. The oil retains most of its beneficial properties. It can be used, for example, in cold cuisine. In cold pressing, the oilseeds enter the press at a temperature of around 20 °C (ambient temperature) and the temperature of the pressed oil does not usually exceed 50 °C.

Characteristics:

- Simplicity of the technological equipment.
- Low energy demands of the technology.
- Small area requirements.
- High quality (virgin) vegetable oil with low phospholipid content.



Hot pressing

Hot pressing is a process with preheating of oilseeds.

In hot pressing, the seed is purposely heated to a temperature of around 100 °C before pressing. Heating of the seeds improves the pressability and higher oil yield is achieved.

Characteristics:

- **The technology is suitable for processing of very high capacities of oilseeds.**
- **High oil yield.**
- **Higher phospholipids content in the oil.**
- **Low energy costs (part of the energy is supplied by steam).**



WP1 – One-level hot pressing

One-level hot pressing is the most universal and widespread technology for oilseeds processing. This technology is convenient not only for seeds with low oil content (soybeans), but also for oil-rich seeds, such as rapeseed and sunflower seed.

WP2 – Two-level hot pressing

The technology of two-level hot pressing offers the highest oil yield of all available technologies. It contains thermal treatment of the seed prior to both stages of pressing to make the release of oil from the seed cells as easy as possible. Heating of the seeds before pressing causes changes of cellular properties, protein transformations, and local concentrations of oil particles at the cell level. The viscosity of the oil also decreases significantly with increased temperature. Together, these effects cause a significant improvement in oil pressability.

Cold-hot pressing

Cold-hot pressing combines the advantages of cold pressing with final hot pressing. **The cold pressing gives the highest-quality oil, ideal for cold cuisine.** The press cakes from final press are then heated to a temperature of around 100 °C and then pressed with high efficiency. This technology can be adjusted to separately handle the oil coming from the pre-press and the final press.

CWP - Cold-hot pressing

The technology of cold-hot pressing offers high oil yields. The first stage of pressing is cold pressing. As a result, the oil from the first stage of pressing does not heat up too much and retains its biologically valuable substances, while containing only a small amount of phospholipids, which facilitates further processing. The second stage involves heat treatment of seed with the aim of facilitating oil release from the cells. Heating the seed before pressing causes changes in the properties of the cell structures, protein transformation and oil aggregation at the cellular level. The viscosity of the oil also decreases significantly with increased temperature. Together, these effects cause a significant improvement in oil pressability.



Pre-pressing

This technology is designed for a wide variety of applications. **Its aim is to press off part of the oil** (usually to 20 % residual fat) with possible heat treatment of the press cakes to increase digestibility. It is mainly used in feed applications and as a pre-pressing prior to extraction.



Pre-pressing with extrusion

The pre-pressing with extrusion technology finds its **use mainly in animal feed applications**. The result is energy-rich and highly digestible feed component, which finds application in nutrition, particularly for poultry and other monogasters, but it is also suitable for ruminants.

Cold pre-pressing

The cold pre-pressing technology does not involve mechanical or thermal treatment of the seed prior to the pressing. **This technology is suitable as a first stage before further pressing or where only partial oil extraction is required and the larger residual oil in press cakes is used in feed mixtures where the oil content is desirable.**

Hot pre-pressing

Hot pre-pressing before extraction is a highly efficient way of preparing oilseeds before chemical extraction. In this process, part of the oil is pressed off by a mechanical way. The technology can be designed for pressing of a wide range of oilseeds (most often rapeseed and sunflower seeds).

OILSEEDS SCREW PRESSES FS 1010, FS 4022

Versatile and highly efficient screw presses designed for processing of high and very high capacities of oilseeds. They offer the optimal solution for maximum oil yield by mechanical processing of oilseeds. These presses are the basis of Farnet's technologies.



Parameters

	FS 1010	FS 4022
Throughput [kg/hr]	1000–4000	4000–16000
Input [kW]	60–132	250–500
Length [mm]	3800	6900
Width [mm]	1570	2000
Height [mm]	1700	2200
Weight [kg]	7600–8500	22000–27000

The indicative data depending on the used technology and the type of pressed seeds.

COMPACT – MODULAR PRESSING SHOP

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The Compact pressing shop offers a completely new perspective on oilseeds pressing. Get rid of your dependence on large processors. This technology is the ideal solution for those who are interested in producing their own vegetable oil and feed. The technology produces high quality filtered vegetable oil and press cakes. The press cakes can be used as a full replacement for extracted meals. Due to the higher oil content, the press cakes have a higher feed value. If the technology is equipped with extruders, it is possible to use the pressing shop without pressing, e.g. for the production of extruded full-fat soya.

Thanks to its modular construction, Compact offers a versatile solution for pressing and extrusion of a wide range of oilseeds. You get a complete delivery that meets the most demanding requirements on modern processing plants.

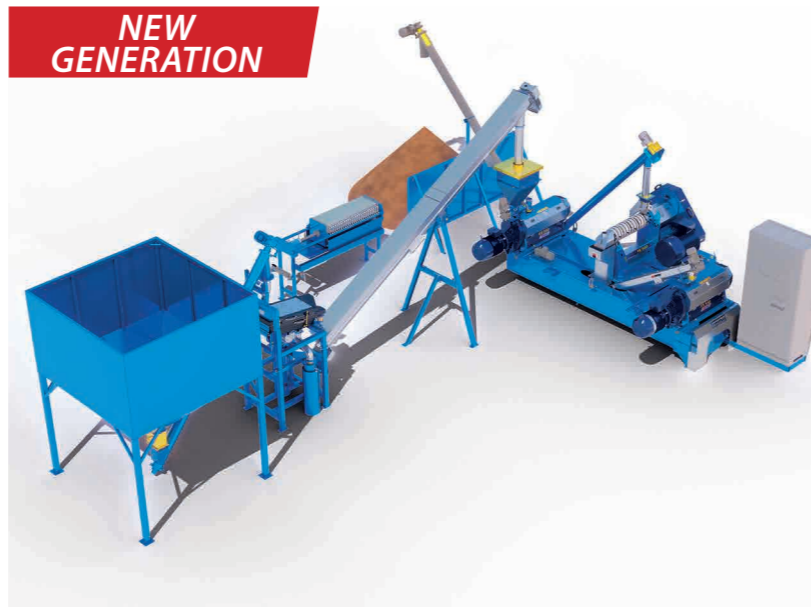


Parameters

	Compact CP1		Compact CP2	Compact EP2		Compact EP1
	CP1 – 1	CP1 – 2	CP2 – 1	EP2 – 1	EP2 – 1 light	EP1 – 1
Capacity of the set for rapeseed/dehulled sunflower [kg/hr]	350*	700*	700*	700*	350*	-
Capacity of the set for soya [kg/hr]	-	-	-	500**	250**	500**
Installed power, for 1 set, no OPTIONS [kW]	55	76	89	145	97	110
Height / including the option of dehulling [m]	4,5 / 5,3					
Installation area without options/incl. dehulling [sq.m]	110 / 135					

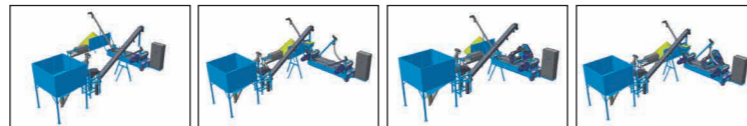
* Throughput is shown as for rapeseed or sunflower (for sunflower, it is valid when dehulling and hull separation is used). When used for sunflower without dehulling, the throughput is lower by 10-15 %.

** Throughput is shown as for soybeans (the technology EP1 is designated namely for soybeans). Valid when used with the OPTION of soybean crushing. When used without this OPTION, the throughput is lower by 10 %.



The main advantages of the technology are:

- Compact solution, pre-assembled incl. full wiring, simple in operation and servicing.
- Complex technological equipment incl. oilseed pretreatment, oil filtration, storage of oil and press cakes.
- Universal technology for a wide range of oilseeds (rapeseed, sunflower, soybeans, etc.), easily expandable, with a number of options available.
- High pressing efficiency with oil yields as in hot pressing.
- High-quality filtered oil, extruded press cakes with ideal nutritional value.
- Low energy demand, simple integrated oil heating.



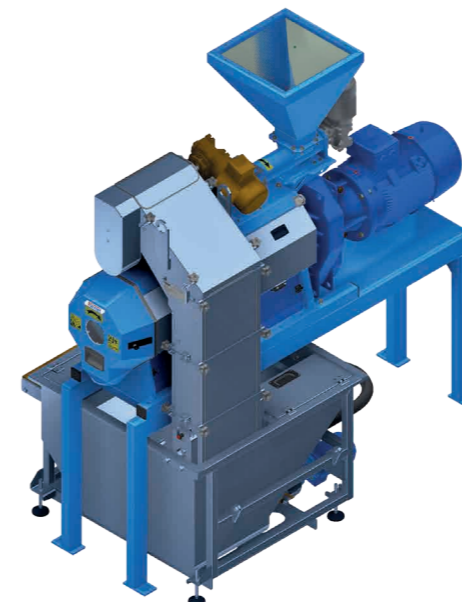
OILSEEDS SCREW PRESS FS 350

Versatile and highly efficient medium capacity screw press.

It offers a modern solution for multi-level geometries, as it is with large capacity presses.

The presses can be assembled into lines for oil production according to the required capacity.

They can process a wide range of oilseeds by cold pressing, hot pressing and pressing with extrusion.



Parameters

	FS 350
Throughput [kg/hr]	160–1000
Input [kW]	15–22
Length [mm]	2120
Width [mm]	640
Height [mm]	840
Weight [kg]	800–950

OILSEEDS PRESSING

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SMALL CAPACITY PRESSES

Are you interested in producing high-quality virgin oil? Or do you want to be independent of the major seed distributors? Then you will appreciate our small capacity presses designed for cold press vegetable oil production.

These presses can process not only the most common oilseeds, such as rapeseed and sunflower seed, but also less common crops, such as jatropha, coconut, hemp, mustard, poppy, artichoke, evening primrose, sea buckthorn and grape seeds. The possibilities of pressing on these presses are almost unlimited.

Besides vegetable oil production, cold pressing also yields press cakes, which are very valuable feed for livestock.

Our presses are ideal for small and medium-sized farmers. They have low space requirements, but offer high efficiency.

UNO, DUO

The Farmet UNO and Farmet DUO oilseeds screw presses are intended for cold pressing of oilseeds without any preceding seed treatment. These presses are designed for high oil yield while maintaining the dietetic qualities of the oil. The presses are designed for pressing common and also less common oilseeds with the oil content of more than 10 %.



COMPLETE OILSEEDS PRESSING UNIT FARMER 10, FARMER 20

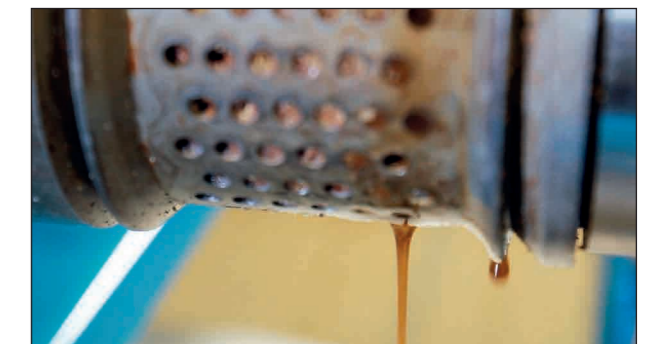
The pressing sets Farmer 10 and Farmer 20 are complete pressing units intended for cold pressing of oilseeds and subsequent oil filtration. Get rid of your dependence on large processors. This technology is the ideal solution for those who are interested in producing their own vegetable oil and feed. **The technology produces high-quality filtered vegetable oil and press cakes.** These press cakes can be used as an adequate substitute of extracted meals. Moreover, thanks to their higher oil content, these press cakes have a higher feed value.



OILSEEDS PRESSING UNIT FLS

Oilseeds pressing unit FLS offers additional possibilities in capacity and quality for pressing special oilseeds. Thanks to the arrangement of the presses DUO, the pressing unit offers a significant increase in the daily production of high-quality cold-pressed oil.

This technology is the ideal solution for those who are interested in producing their own vegetable oil and feed. **The technology produces high-quality filtered vegetable oil and press cakes.** These press cakes can be used as an adequate substitute of extracted meals. Moreover, thanks to their higher oil content, these press cakes have a higher feed value.



Parameters

	UNO	DUO	Farmer 10	Farmer 20	FLS
Throughput [kg/hr]	9-12	18-24	9-12	18-24	54-72
Input without options [kW]	1,1-1,5	2,2-3	1,6-2,2	2,7-3,5	7-12
Frequency converter	optional	optional	optional	optional	optional
Length [mm]	870	775-780	875	700	2740
Width [mm]	225	455	725	1140	1070
Height [mm]	255-315	320-400	1100	1575	2100
Weight [kg]	75-80	100-110	140-150	230-240	820-835

The indicative data depending on the used technology and the type of pressed seeds.

Dehulling and Separation of Hulls

Proper treatment and preparation of seeds is a major prerequisite for the effectiveness of subsequent processing. It also influences the quality of final products - oil, press cakes, or extrudate. That is why we have been continuously developing and improving seed preparation technologies along with pressing and extrusion technologies for more than three decades.

For fast and efficient fattening of livestock, it is advantageous to use feed with a high protein content and a minimum of fibre. Seed dehulling is an elegant way to achieve this.

Dehulling technology serves for partial removal of hulls from rapeseeds, sunflower seeds and soybeans. Fibre content in the hulls is considerable, especially in the aforementioned types of oilseeds. **Removing part of the of hulls from the processed material will significantly reduce the total fibre content in press cakes. Another positive effect of dehulling is higher oil yield from the pressed material.** Our technology is offered at capacities ranging from 600 kg of seeds per hour (for the technology "Compact") to tens of tons per hour.

For this technology also comes with complete engineering and other services, such as technical support, service possibilities, and accessible spare parts. **For efficient operation, all technologies delivered by Farmet naturally come with a control system – Farmet Intelligent Control (FIC).**

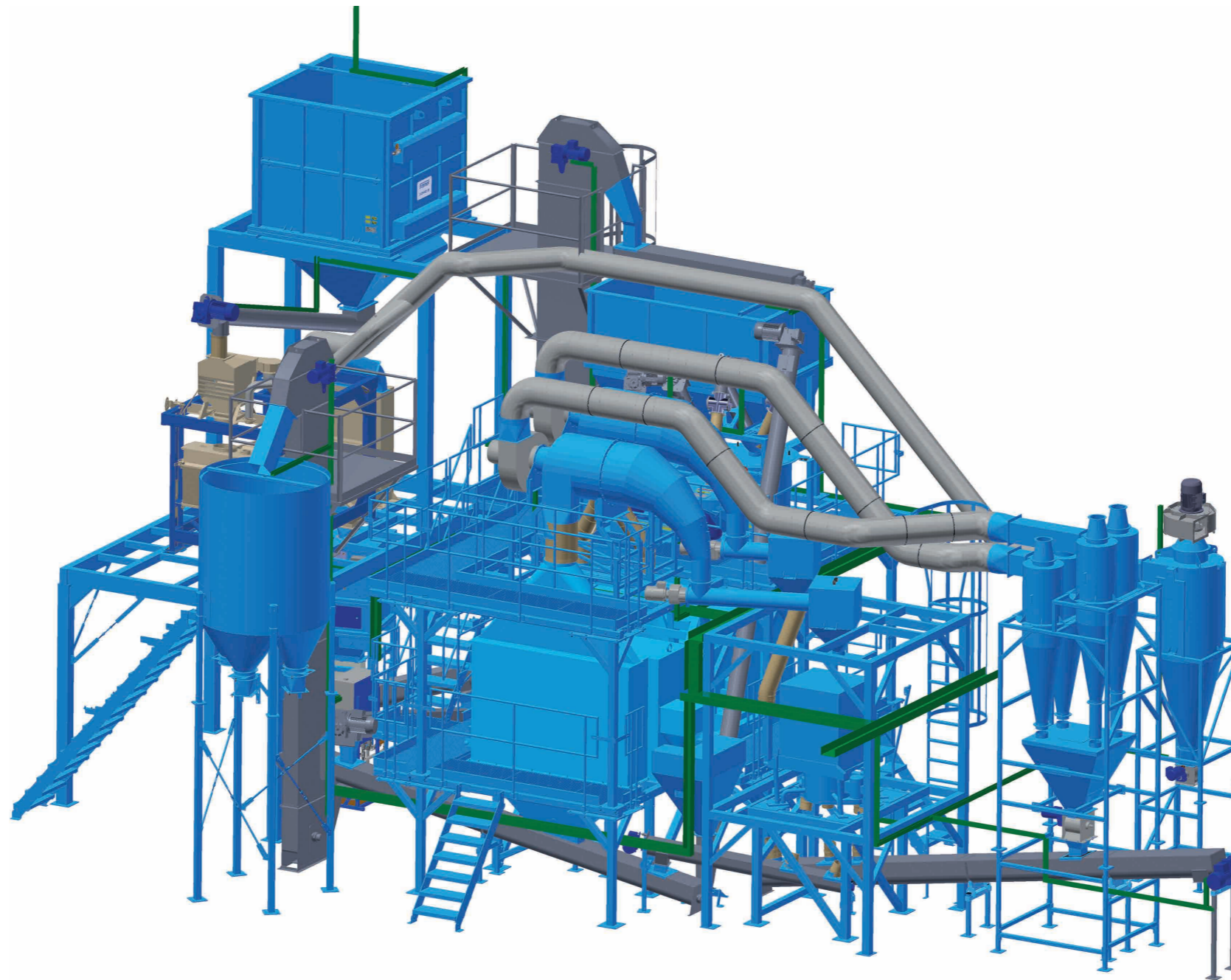


One-stage Dehulling

Company Farmet offers two versions of one-stage dehulling: one technology is without hulls returning and the other technology is with returning of hulls. Returning of hulls allows further dehulling of still-unhulled seeds.

Two-stage Dehulling

This technology is an excellent solution for large-scale pressing plants. It is optimized for high oil yields and a high quality of press cakes for feed purposes.



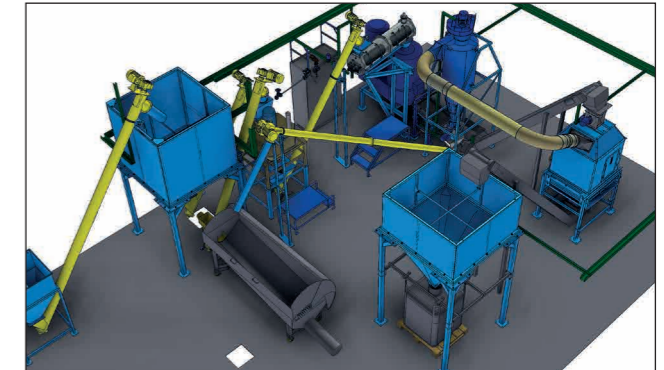
Advantages of partial removing of the hulls before pressing and achievable parameters:

- Fibre content reduction in press cakes leading to a higher-quality feed.
- Increase in oil yield.
- Reduction of wear of the pressing units.
- Reduction of waxes and pigments content in the oil.

The technology of granulation (pelleting) is used for sunflower or soybean hulls processing into the form of granules (pellets), which are more suitable in terms of handling, storage and subsequent use of the hulls. The whole technology is equipped with automatic control and regulation with process visualisation.

Granulation of hulls

Company Farmet offers granulation technology of oilseeds hulls, mainly for sunflower. Its aim is to obtain pellets that can be stored and transported efficiently and may serve as a valuable biofuel with a high calorific value.



EXTRUSION AND PRODUCTION OF FEED MIXTURES

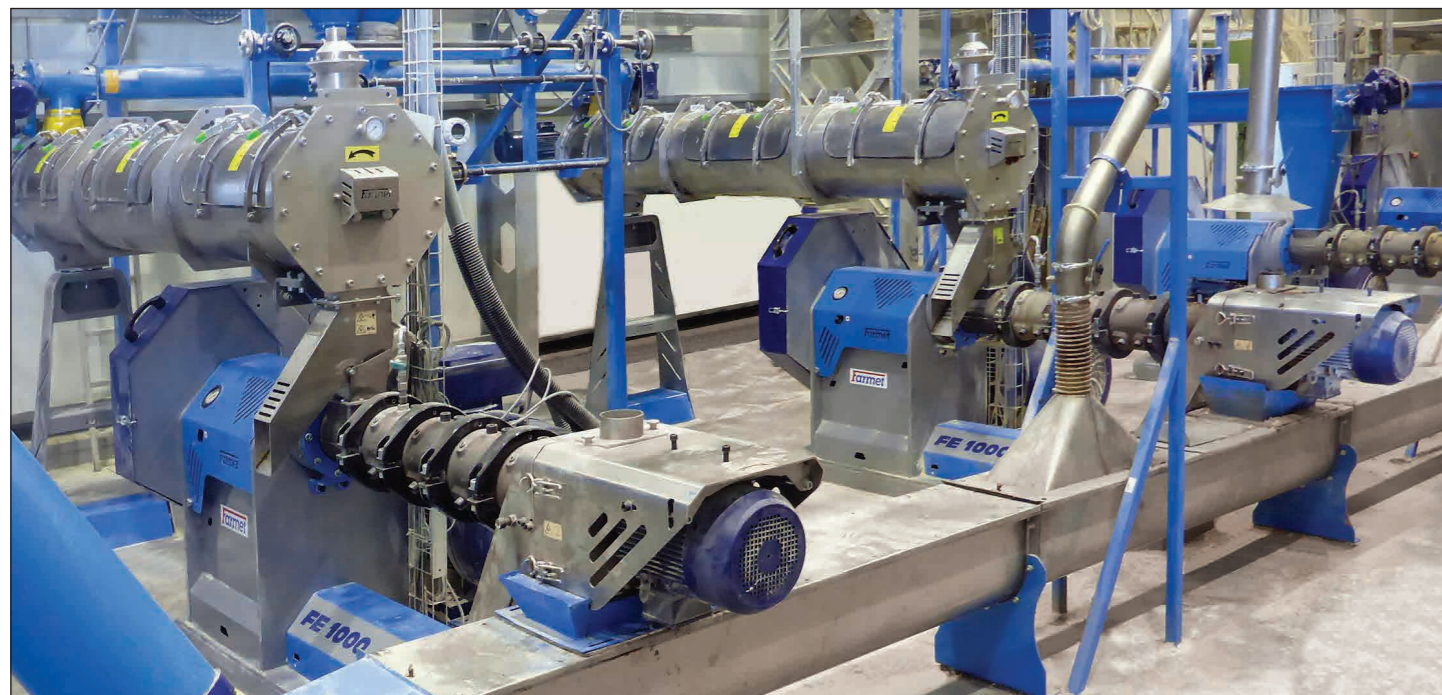
EXTRUSION AND PRODUCTION OF FEED MIXTURES

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Company Farnet offers highly effective and optimized technological solutions for production of the highest-quality feed. Each technology is tailor-made for each customer and always offers optimized operating costs and meets the strictest hygiene standards. In the production of our technology, we place emphasis on the reliability of our machines to achieve trouble-free operation with minimal downtime.

Simplicity of operation, easy maintenance and high efficiency are the main advantages of Farnet technology. Our solutions are always accompanied by technical support, engineering services, installation, putting into operation, and a reliable, high-quality warranty and post-warranty service. Our goal is full customer satisfaction.

Our company Farnet produces screw feed extruders that cover a range of performance and application. These feed extruders can be further assembled into extrusion lines. Overall performance is then determined by the number and type of used extruders. The performance and ability to process (extrude) different types of materials can be significantly influenced either by mechanical pre-treatment (grinding, crushing), or water addition, steam injection.









Extrusion

Extrusion is one of the most widely used methods of heat treatment of material to obtain high quality feed. Extrusion contains mechanical grinding, kneading, heating at high pressure, and squeezing the material through a die with the aim of reaching mechanical and heat treatment of the material. Extrusion is called as a „HTST method“ (High Temperature Short Time), because it uses a short-term effect of high temperature and pressure on the processed material (this short-term effect is gentle to nutritionally valuable substances and during proper process optimization there is no significant decrease in them). Possibility of automatic temperature control at the outlet! Patented system of energy recovery.

Main benefits of extrusion:

The extruder can efficiently process biological material, which can be than used both in feed mixtures and as well as in the food industry. The obtained feed can have many forms/shapes – e. g. granules (sinking, floating).

- | | | |
|---|---|---|
|  | Removal of anti-nutritional substances | ▶ Increases taste, digestibility and availability of nutrients. |
|  | Denaturation of proteins | ▶ Increases energetic value, decreases volume of feed ration, saves feed and finance. |
|  | Increased hygienic quality of feed | ▶ Extends storability. |
|  | Starch gelatinization | ▶ Enables better workability and better digestibility of feed. |
|  | Homogenization of mixtures | ▶ Better nutrient availability. |
|  | Mechanical grinding | ▶ Simplifies digestion and makes better input of nutrients to the digestive system. |

PRODUCE OPTIMAL AND HIGH-QUALITY FEED

Thermal extrusion (DRY)

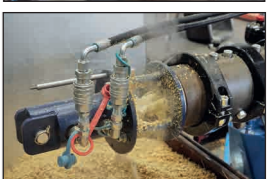
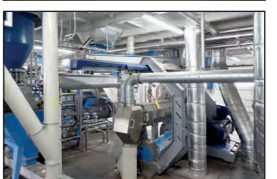
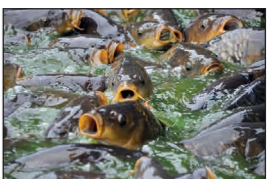
Extrusion of non-cohesive materials where the main effect is thermal treatment of protein and reduction of antinutrients. The most frequently extruded crop is soya, which requires quality thermal treatment thanks to the high content of antinutrients. To regulate temperature from the outside (without having to replace the inserts), the extruder is equipped with a central throttling element on the outlet – a throttle screw, or a hydraulic regulation head.

Wet extrusion and granulation

The main effect is the **formation of dimensionally stable pellets**. The extruded material must contain a binding agent (most often starch) and a higher amount of water is usually added (10–30%, in the form of steam and water) in order to achieve gelatinized starch and a sufficient expansion of the granules; the process is thus often called Wet Extrusion. **Typical representatives of such material includes cereals and their meals (corn, wheat, barley, rye, oats) and some legumes and their meals (pea, beans) and their mixtures. To achieve the shape, the extruder is equipped with a granulation die and a cutter at the outlet.**

Texturization (TVP)

Texturization is modification of plant proteins by extrusion where the main effects is the formation of a porous fibrous structure (texture). The protein texturate excels in high absorbing capacity, the ability to bind water, and it is used in food processing. **Texturization of vegetable proteins by extrusion for the purpose of production of meat-like texture is known for a long time.** Currently, meat replacements rise in popularity, particularly due to the wave of vegetarian and vegan movement, concerns about food safety and rising responsibility for health and environmental factors of human nutrition. **Therefore, many companies invest into the production of meat replacements and similar meat-like products.**



EXTRUSION AND FEED MIXTURES PRODUCTION

EXTRUSION AND FEED MIXTURES PRODUCTION

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and complex services*

Complete model range of extruders FE

Extruders of the FE line represent top-class equipment, which excel in versatility, variability and effectiveness. Many modified configurations of these extruders are offered, allowing optimal solution for any farmer or feed producer. They cover a performance range between 100 kg per hour and 6,000 kg per hour and they can be assembled into extrusion lines with an overall performance as a sum of individual extruders.

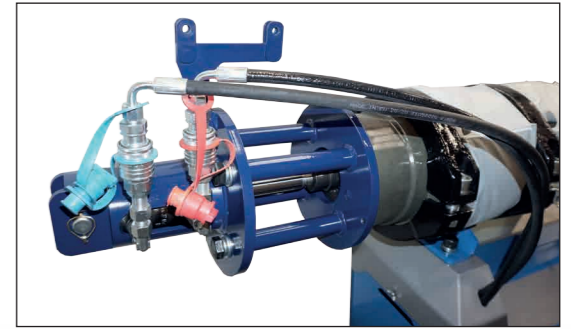
Extruders can be well adjusted to the customer's requirements, mostly because of the richness of available accessories and their modular design. In this line you will find the basic versions for dry extrusion, which are intended for the extrusion of legumes and oilseeds (e.g. full-fat soybean), but also complex machines for wet extrusion, which not only regulate dosing the water into the extruder chambers, but also allow adding fat into the feed by dosing oil (e.g., granule production for fish feed). For pretreatment of material by extrusion we have also developed steam conditioners of the FK line, which allow heating and moistening of the extrudate to desired levels.

The main advantages of the FE series of extruders are:

- Working parts with long service life.
- Easy replaceability and repairability of working parts.
- Easy assembly and disassembly of working parts.
- Easy modification of the extruder for dry or wet extrusion.
- Intelligent extrusion control system EXTRUSION EFFECT CONTROL.
- A wide range of accessories.

Automatic hydraulic nozzle for extruder:

- Ideal solution to prevent possible damage during the operation of the extruder.
- Easy controllability of pressure and thus connected extrusion temperature.
- Easy handling and maintenance.
- Can be implemented in all current FE series of extruders for dry variant (Thermal extrusion); used the same outlet chamber.



EXTRUDER FE 100

EXTRUDER FE 250

EXTRUDER FE 500

EXTRUDER FE 1000

EXTRUDER FE 4000

Parameters

	FE 100	FE 250	FE 500	FE 1000	FE 4000
Throughput [kg/hr]	80–180	200–400	400–800	800–1600	3600–6000
Input without options [kW]	15	22–30	55	75–132	250–400
Length [mm]	1940	2311	2260	2830	5200
Width [mm]	1025	1350	1415	2450	2477
Height [mm]	1780	1762	1900	2080	2590
Weight [kg]	560	1000	1550	2650	8150

The indicative data depending on the used technology and the type of extruded material.



EXTRUSION AND FEED MIXTURES PRODUCTION

The effective technology and complex services

Feed mixtures production

Farmet offers sophisticated technological equipment for compound feed preparation and production. Compound feed is a homogenous mixture with a constant ratio of various loose components, together comprising the optimal daily dose of nutrition for a given livestock species. It contains crushed grain, extracted groats, minerals, mill waste, animal-derived meal, premixes and supplements, liquid additives, etc.

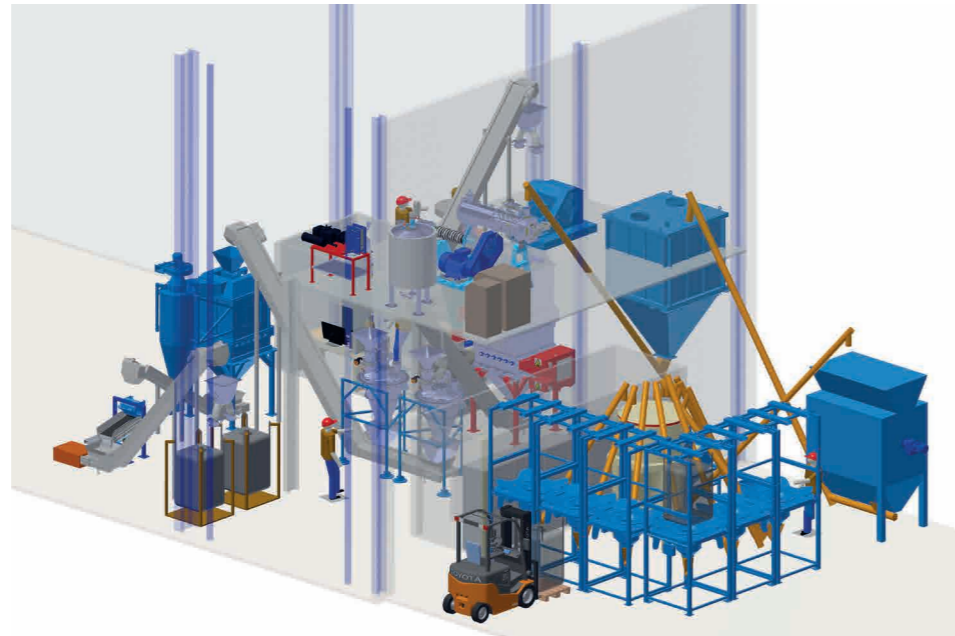
MVKS

Small compound feed production plants are offered either with an automatically drawing grinder (MVKS-s), or a vertical grinder (MVKS-v). They are intended for small and middle-scale producers of compound feed; basic components (grain) are stored freely on the floor space.

VKS – Feed mixture plants

The feed mill plant is a facility suitable mainly for medium-sized feed mixtures manufacturers. The basic ingredients for feed mixtures (grain) are stored in silos (or alternatively, on the floor, with a mechanized supply into the weighing devices). Premixes and supplements are available in bags.

Considering the higher production capacity, the facility makes use of temporary containers before grinding and mixing, which leads to a continuous workload of the grinder. The advantage is the high efficiency of the plant and the possibility of producing more mixtures of different types with subsequent storage for dispatch.



Parameters

Main equipment used	Unit	MVKS - s	MVKS - v	VKS
Vertical upright mixer	pcs	1	1	-
Horizontal mixer	pcs	-	-	1
Hammer mill	pcs	1	1	1
Roof height w/o options	m	6	7	10
Area w/o options	m ²	12	15	45
Total installed input (usage rate 80 %, w/o options)	kW	15 / 20 / 23	16 / 19 / 23 / 27	72
Technology parameters	Unit	MVKS - s	MVKS - v	VKS
Maximum throughput	t/hr	0,5 / 1 / 1,5	0,5 / 1 / 1,5 / 2	2,5-5
Mixing precision		1 :10 000	1 :10 000	1 :100 000

Complex soybean processing

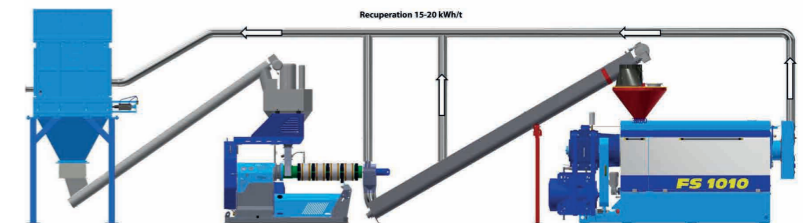
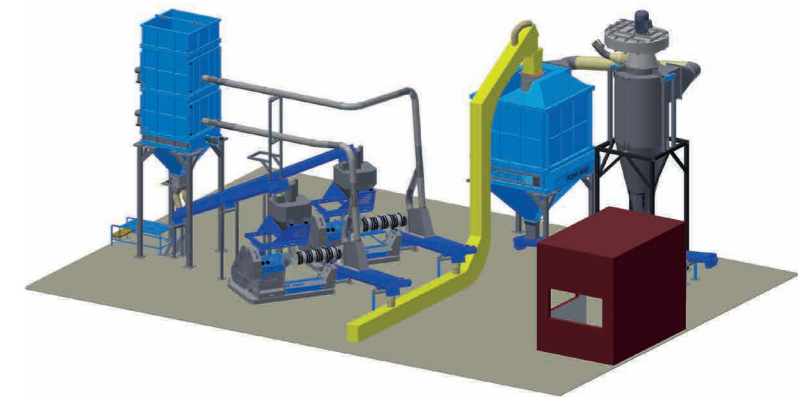
Company Farmet offers a unique technology for the complete processing of soybeans. This technology involves a complex approach to processing soybeans to final products, i.e. oils for food, feed or technical use and products based on press cakes, which may differ not only in nutritional composition (protein, fibre and fat content) but also in terms of structure and texture of the final products.

The uniqueness is based on the possibility to produce different products on one technology by simply changing the process parameters of the technology. The final products are then used in a wide range of food, feed and technical applications.

With our technologies you get:

- Hexane free technology Farmet that is both the most economical and environmentally-friendly.
- The 7% fat content is the ideal ratio for all animals. Optimal feed for every type of animal.
- Hexane free technology Farmet brings you the ideal feed with the optimal ratio of fat (energy) and proteins.
- Thanks to the hexane free technology Farmet you obtain the most effective feed at the lowest costs.
- The lowest operating costs thanks to Farmet technology that uses maximum recovery.
- Complex technology guarantees low operating costs.

PATENTED SYSTEM OF ENERGY RECOVERY RECU



Parameters

	Raw soybeans	Extruded soy	Extruded and pressed soy cake	Extruded soy meal
Moisture	12 %	7 %	5 %	12 %
Fat	21 %	21 %	5-7 %	2 %
Urease activity	2-10 mg N/g/min	up to 0,4 mg N/g/min	up to 0,4 mg N/g/min	up to 0,4 mg N/g/min
Trypsin inhibitor	75-115 mg/g	2-5 mg/g	2-5 mg/g	2-5 mg/g
Protein	40 %	40 %	44-47 % *	40-48 %

*Can be increased using the OPTION of dehulling.

SOYA – TRANSFORMATION OF PROTEIN FRACTIONS FOR RUMINANTS ACCORDING TO THE CORNELL SYSTEM

Fraction	Before extrusion	After extrusion	
A2	87 %	21,5 %	Protein fraction and other nitrogenous substances fully degrading in rumen.
B1	10 %	76,8 %	Protein fraction slowly degrading in rumen, paertially transiting to small intestine.
B2	2 %	0,4 %	Protein fraction non-degrading in rumen, fully transiting to small intestine.
C	1 %	1,3 %	Indigestible.

Oil filtration

The technology of filtration offered by Farnet company represents an effective solution for removing mechanical impurities from raw oil. The equipment can be used for multiple types of oil. Since oils from different plant species can differ, the species always needs to be specified as well as how the oil was obtained and expected temperature range for filtration.

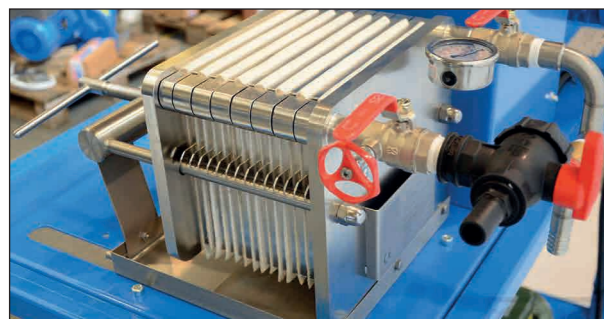
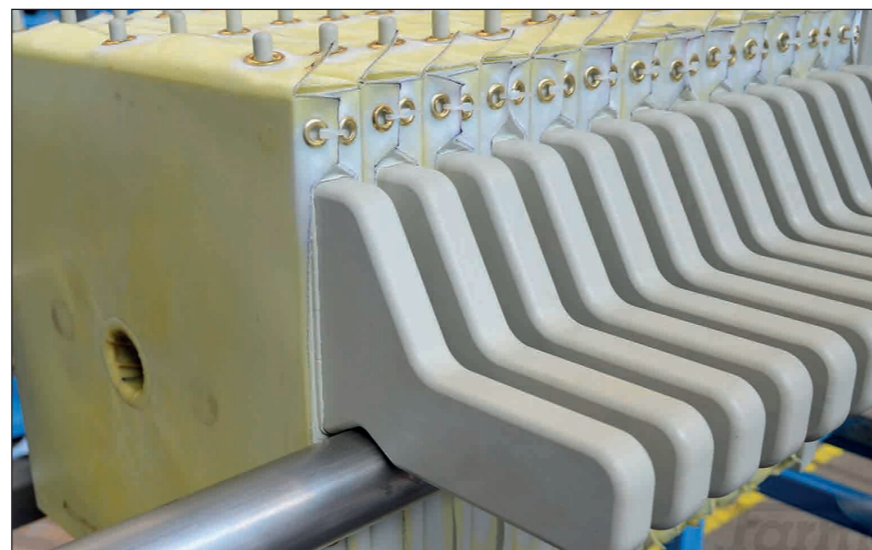
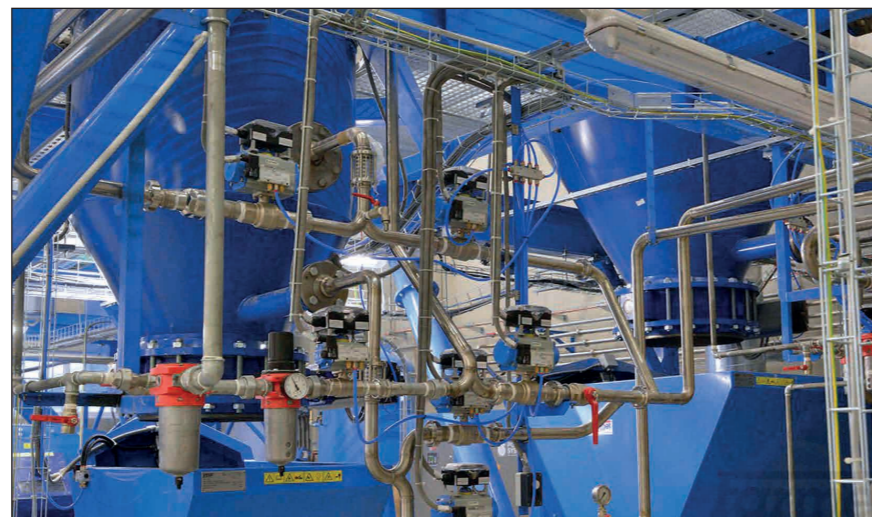
Based on our extensive experience in the field of obtaining and processing of vegetable oil, we have developed two systems of filtration, which fit different capacities of oil processing. **For small- and middle-scale throughput, we offer plate filters, where all the individual steps are controlled manually. The technology of automatic filtration serves for middle- and large-scale producers; the entire procedure runs automatically.** Automatic filtration is controlled by our own control system **FIC (Farnet Intelligent Control) with the function "FILTER OPTIMAL"**, which is a system of settings for optimized conditions for transitions between filtration phases.

Automatic filtration

The automatic filtration is a technology designed for the vegetable oil filtration, especially for the removal of solids, which are introduced during oilseed pressing. This technology is offered for middle- and large-scale pressing shops. The technology of automatic filtration stems from Farnet's extensive experience with raw oil processing. **Its main advantage is a highly sophisticated control system that allows optimization of the filtration process in accordance with the properties of raw oil.** The technology is also always optimized to meet particular requirements of the customer.

Plate filters

Plate filters represent an optimized solution for small-scale and middle-scale pressing shops. These filters offer superb filtration parameters at low running costs and purchase price. Maintenance of our filters is made easy thanks to their simple yet extremely robust design.



Physical refining for local oil processing

Vegetable oil obtained through pressing or extraction contains various unwanted impurities that naturally occur in the seeds. These substances include mainly phosphorus (bound to phospholipids), pigments, wax, and volatile particles. They may cause undesirable colouration, unwanted odour, and burning at contact surfaces, all of which hinders the use of crude oil in both food and technical industries. Company Farnet offers technological equipment for oil refining according to the customer's needs.

The process of oil refining has four steps: degumming, bleaching, dewaxing, and deacidification. These technologies can also be supplied separately.

The parameters of the entering oil significantly affect the quality of the process and material balance. As a general rule, lowering of the amount of impurities at the input leads to lower consumption of reaction agents, less by-product, and a higher-quality oil at the line output. Also, processing old oil is troublesome, since extended storage time causes oil to lose its potential for chemical reactions and refining.

Are you interested in increasing the value of your oil? Then you will appreciate our oil refining technology. This technology is tailored for every customer according to their demands on the resulting quality of oil. Do not hesitate to contact our experts, who will help you choose the best solution for you.



- Get vegetable oil in a purely physical way without the use of chemicals.
- We achieve a very deep vacuum - a vacuum below the industry standard of 2 mbar.
- Thanks to a complex solution, we recuperate the maximum amount of energy.
- Low energy requirements of vacuum generation thanks to an optimized freezing system.
- Low process oil loss - no soap is produced.
- Minimisation of waste due to efficient use of by-products (lecithin, waxes, free fatty acids).
- High antioxidant content and low content of trans-unsaturated fatty acids and process contaminants.
- Refining for special oils from 100 kg of oil per hour.

Soybean oil processing illustration



Degumming

The technology of degumming offers a solution for the removal of phosphorus from crude oil. Phosphorus is bound to phospholipids, which are undesirable for further oil processing. At higher temperatures, phospholipids burn to contact surfaces and thus

hinder both edible oil refining process and uses for biofuel purposes. Phospholipids end up burning to the surface of a saucepan in the kitchen, or to the pistons in car engines. Burning also causes unpleasant smell and damage to the exposed material.



- A physical process without the use of chemicals.
- Universal use for different types of oils (e.g. soybean, sunflower, rapeseed oil).
- Automatic switching of degumming modes = Water, Basic and EXTRA.
- Technology equipped with a high quality centrifugal separator.
- Maximum pre-assembly prior to shipment for simple and quick installation on site.
- Complete delivery including FIC control, stainless steel design, insulation and gums separation for decreasing losses in oil and the possibility of lecithin sludge separation.
- Standard delivery including extras: oil drying, source of vacuum, source of cooling water, safety filters at the input and output.
- Precise process control (flow control) based on high-quality mass flowmeter, management of various recipes, wide variety of outputs.
- Compact delivery- transportable on 1 standard semitrailer.

Bleaching

Oil bleaching is a step in the process of crude oil refining. **In the bleaching technology, bleaching earth is applied to crude oil, minimizing its content of pigments (e.g., carotenes and chlorophylls), heavy metals, and the phosphorus remaining after degumming.** This improves the appearance and taste of the oil.



Dewaxing

The dewaxing process is only intended for sunflower oil. This is because of the wax that penetrates the oil from seed hulls and causes higher turbidity (cloudiness) or a sediment at the bottom of the vessel. **After processing, the oil becomes pure (even at low temperatures) and, of course, more attractive for consumers.**



Deacidification

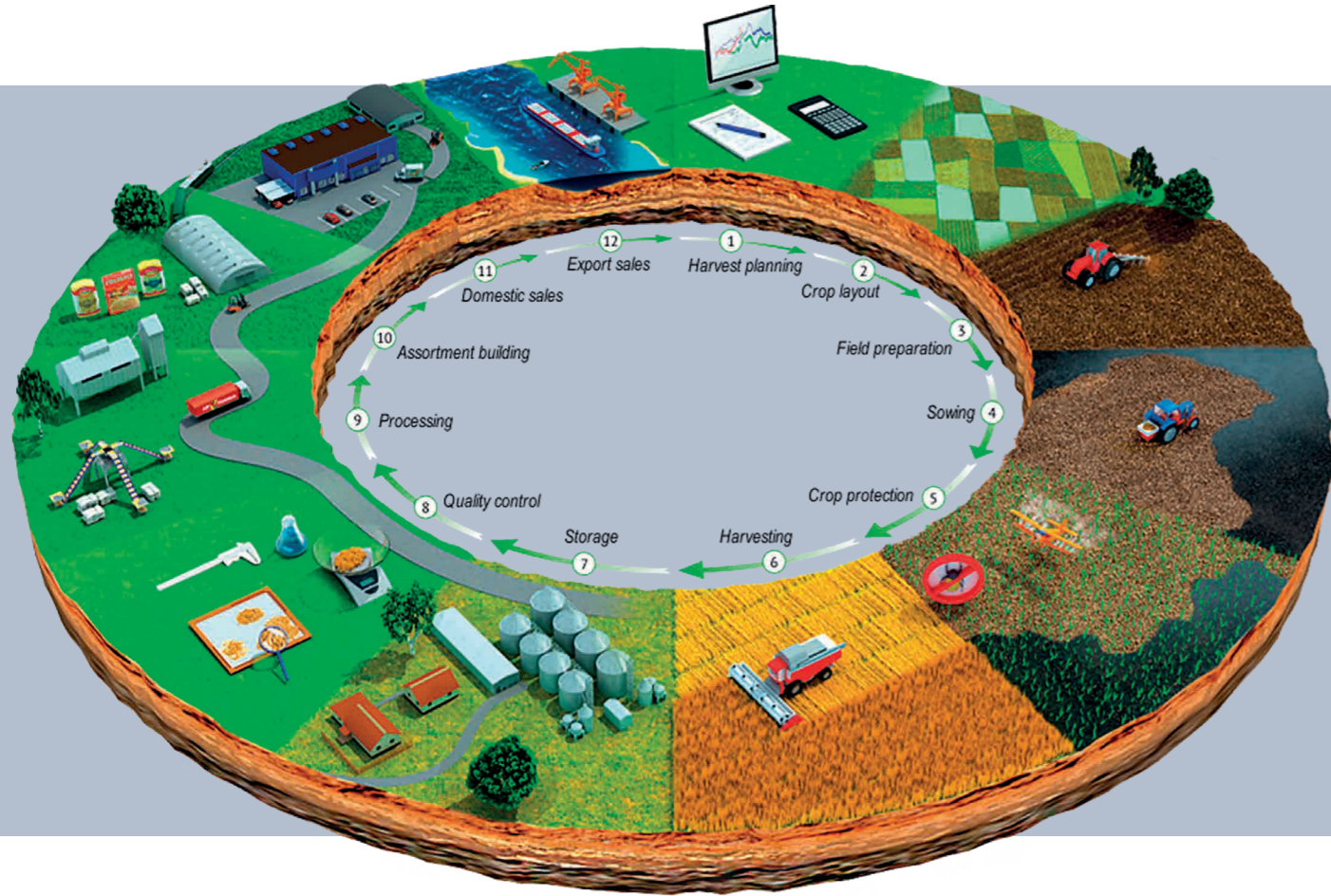
The goal of deacidification is the removal of naturally occurring substances that cause unwanted smell and taste. These volatile substances vaporize at higher temperatures, then condense and stain surrounding surfaces (for example, kitchen walls). These substances can be removed in distillation columns.



HORIZONTAL AGRICULTURE

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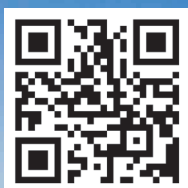
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