

ICHEMAD
P R O F A R B

PRZETWÓRSTWO TWORZYW SZTUCZNYCH
- TECHNOLOGIA WYTŁACZANIA

CONTENTS

Subject	04
From design to execution	04
· Extruders	05
- single-screw	06
- single-screw special	07
- single-screw for processing rubber blends	08
- for processing food	09
- double-screw conical and cylindrical	10
· Complete process lines	13
- for production of pipes	14
- for production of profiles	15
- for granulation and regranulation	16
Spare parts and services	19
- equipment for process lines 20	20
- extruder and line control systems 21	21
- extruder and line control systems .21	22
- refurbishment of plasticizing systems .23	23
- metalworking services and nitriding .24	24
Contact details	26

SUBJECT

This catalogue refers to the information contained in the company's image catalogue, which concerns plasticizing and extrusion operations performed on plastics, rubber, and food products.

The basic element of every production line is a plasticizing system and it is on it that we focus our technical efforts. Correct and highly efficient operation of the plasticizing system guarantees the highest quality of the extruder and of the entire line.

Selection of an appropriate technical solution for the plasticizing system and ensuring the optimum geometry of the screw are the basic conditions for proper operation of the extruder.

This is why the choice of an optimal technical solution is the subject of in-depth research and process optimization efforts at the equipment design stage.

The aim of the catalogue is to present the whole portfolio of equipment and machines that make it possible to apply various

kinds of raw materials. We approach each technical solution individually in close cooperation with the future user.

Design and process documentation is prepared by our experienced engineering team, based on several decades of experience and with care for continuous development of offered machines and equipment.

We have specialized machinery operated by a highly qualified team of experts. Based on detailed design and process documentation, we manufacture plasticizing systems with a wide range of geometries.

We always treat each technical solution individually, knowing that only in direct cooperation with the client will we work out the optimal solution. We are looking forward to working with you.

FROM DESIGN TO EXECUTION

At ICHEMAD-Profarb, we have over 50 years of experience in design and construction of complete process **lines for plastics processing**. The basis of our designs are single- and double-screw extruders. We also specialise in the construction of innovative equipment for processing of other materials, e.g. food raw materials, by extrusion.

As a part of cooperation with our clients, we prepare complete design documentation, on the basis of which we build our equipment. Then we build and install advanced and automated process lines at the client's plant. The equipment we install is fitted with innovative control systems and the degree of process automation is tailored to the needs of each client individually.

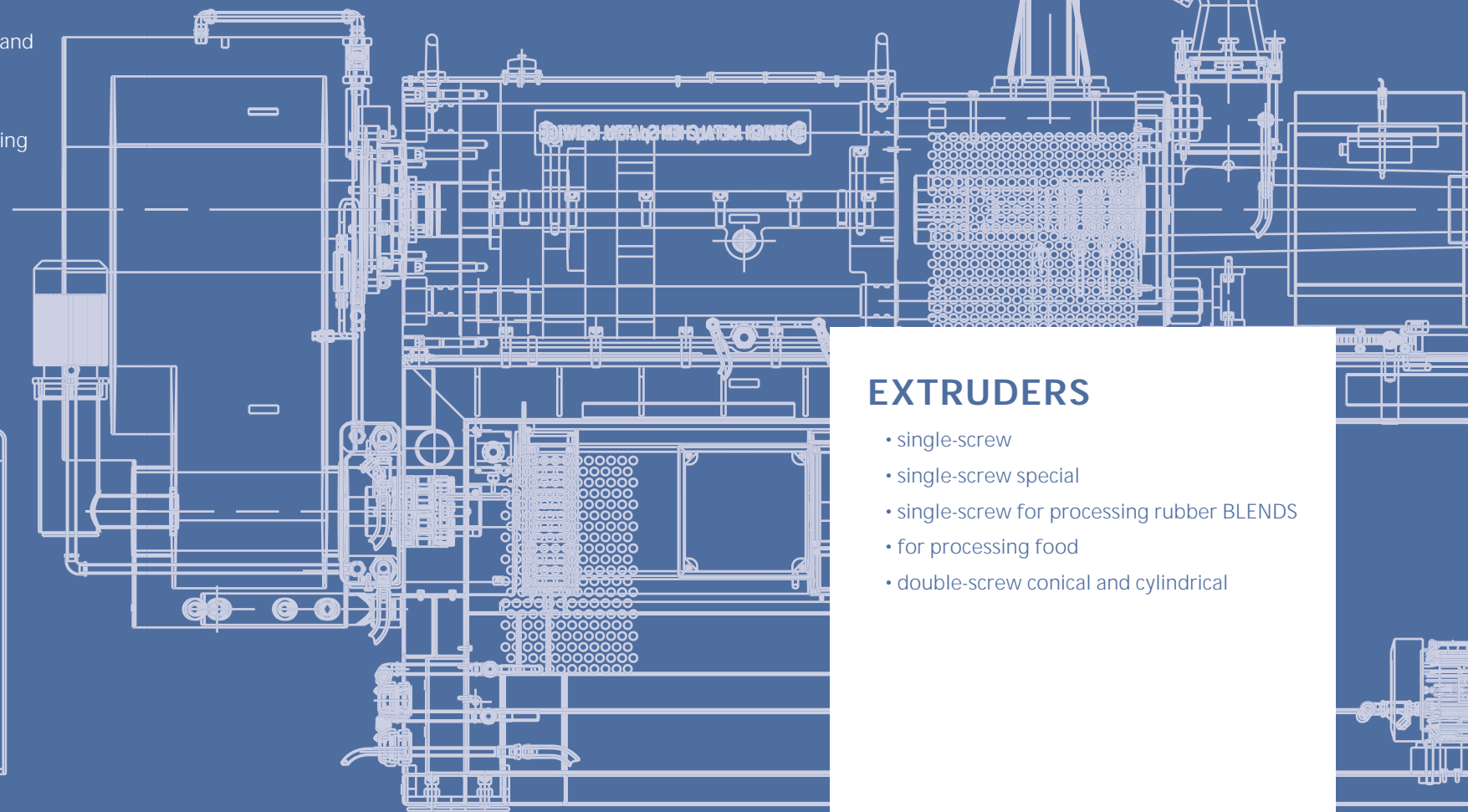
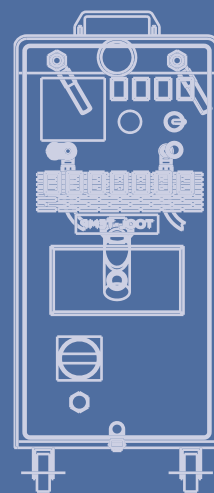
Our long experience and the high qualifications of our staff guarantee the highest quality of design and production work. Using **specialized software**, we prepare:

- 3D and 2D designs of both equipment and complete process lines,
- dynamic simulations and strength analyses,
- analyses of thermoplastic materials extrusion process simulations,

- automation projects and I/O card diagrams of PLCs, and
- models with CFD methods.

Extruders and line equipment manufactured by ICHEMAD-Profarb meet the requirements of the following directives:

- Directive 2006/42/EC (machinery directive),
- Directive 2014/30/EU (electromagnetic compatibility directive), and
- Directive 2014/35/EU (low-voltage directive).



EXTRUDERS

- single-screw
- single-screw special
- single-screw for processing rubber BLENDS
- for processing food
- double-screw conical and cylindrical

SINGLE-SCREW EXTRUDERS

Single-screw extruders designed and manufactured by us are designed for extrusion of thermoplastic materials in the form of granules, equipped with a precise electric-air thermoregulation system, an AC motor and an infinitely variable screw speed control system. They are equipped with a control cabinet and a control panel. Extruders act as the main piece of equipment in production lines or as co-extruders.

The equipment offered by ICHMAD-Profarb are characterized by a compact design and by high quality and aesthetics, and the components used and intelligent control systems, built with parts and components from leading global suppliers, guarantee energy-efficient and reliable operation.



Energy-efficient machines for all types of raw materials (plastics)

TECHNICAL DATA (range):

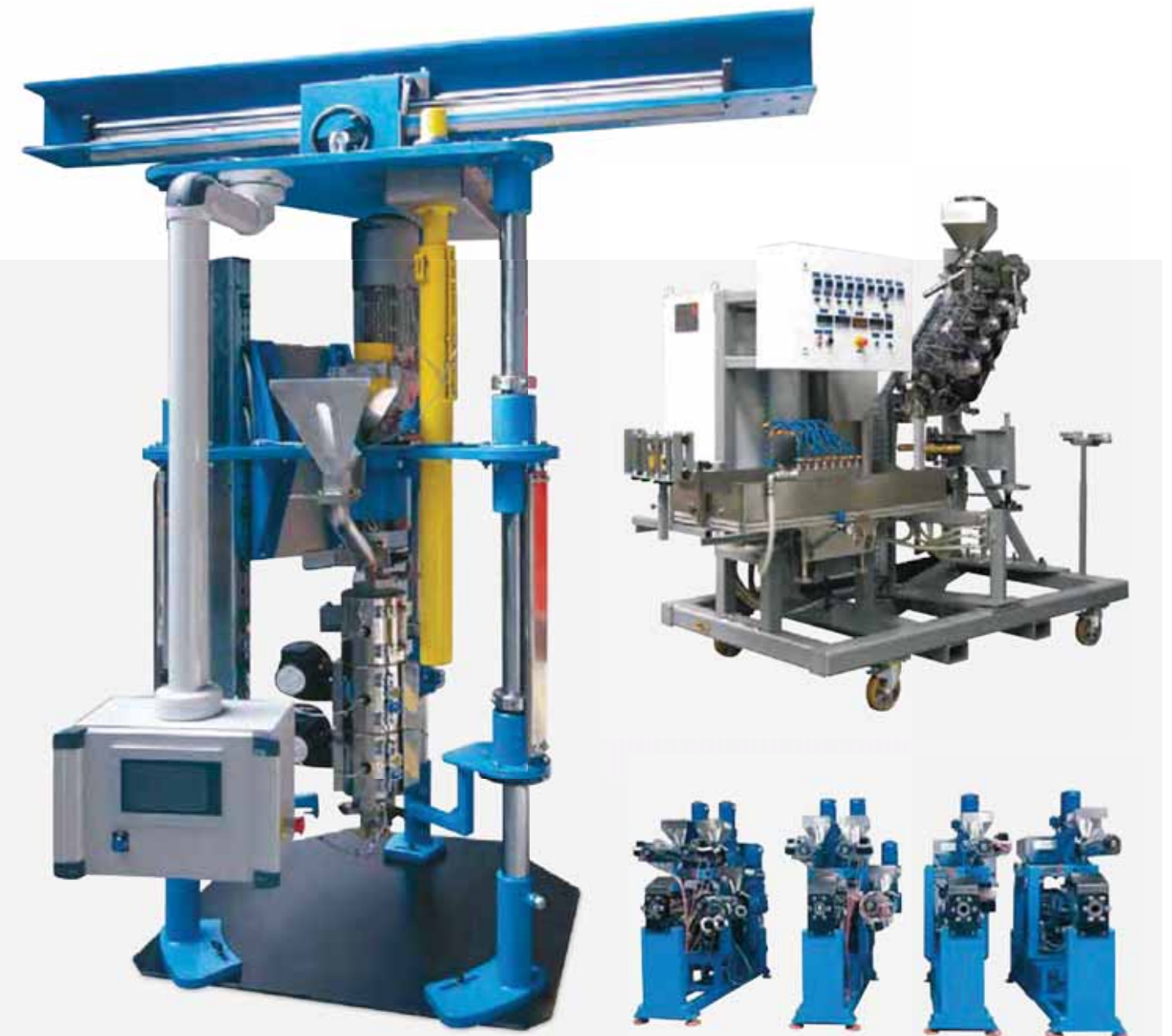
Screw diameter (mm)	Relative length L/D	Speed (rpm)	Feeding zone	Main motor power (kW)	Standard thermoregulation	Output (kg/h)
20 – 150	10 ¹⁾ – 40 ²⁾	40 – 320	Smooth or grooved	1,5 – 315 ³⁾	Electrical heating air cooling	2 - approx. 1,000 ³⁾

- 1) for silicone and certain food applications,
- 2) mainly for foamed plastics,
- 3) depending on the screw diameter and type of material

SPECIAL SINGLE-SCREW EXTRUDERS

Custom design extruders, made taking into account the client's special requirements. The special design allows the screw axis to be put in a

vertical, slanted, or height-adjustable arrangement. Moreover, the extruders are equipped with components agreed individually with the client.



Extruders designed strictly according to the client's needs

TECHNICAL DATA (range):

Screw diameter (mm)	Relative length L/D	Speed (rpm)	Feeding zone Main	Main motor power (kW)	Standard thermoregulation	Output (kg/h)
20 – 45(60) 20 – 25(30)	60 – 200	Usually smooth	1.5 – 15 (30) ₁₎	Electrical heating Air	cooling	2 – 801)

SINGLE-SCREW EXTRUDERS FOR PROCESSING RUBBER BLENDS

Single-screw extruders designed for extrusion of rubber blends (rubber-based plastics), usually in the form of strips of pretreated mixture. Equipped with a precise water or water-electric thermoregulation system.



Innovative solutions, tailored to individual client's needs

TECHNICAL DATA (range):

Screw diameter (mm)	Relative length L/D	Screw speed (rpm)	raw material form	raw material feeding method	main engine power (kW) ₁₎	thermoregulation of the screw and the cylinder	thermoregulation of the head	Output (kg/h) ₂₎	equipment dedicated	control cabinet
60 – 125	16 – 22	60 – 110	strip rubber blend	cylinder power supply zone, by the roller mechanism	37 – 110 (or more)	electric heating or water cooling	electric heating or water, cooling	60 – 800	degassing system, individual thermostats (water heaters and coolers)	free-standing

1, 2) depending on the screw diameter and type of material

EXTRUDERS FOR FOOD PROCESSING

Extruders designed for the extrusion of simple food products and semi-finished products, such as corn crisps, crispy bread, and animal feed.



Cost-effective and uncomplicated extrusion of food products and animal and fish feed

TECHNICAL DATA (range):

Extruder	Screws diameter (mm)	Relative length L/D	Max. speed (rpm)	Main motor power (kW)	Standard thermoregulation	Wydajność (kg/h)
single-screw	45, 60 i 90	12 (16)	60 – 150	11, 22 i 55	Electric heating air cooling or use of thermostats	30 – 200
double-screw	2 x 95/52,5	none	70	37		Do 100

CONICAL AND CYLINDRICAL DOUBLE-SCREW EXTRUDERS

Extruders with counter-rotating conical screws, designed primarily for processing PVC in dry powder form

(dry blend). Extruders equipped with a plasticizing system with precise thermostats, a raw material dispenser, and an extruded material degassing system.



DANE TECHNICZNE (zakres):

Screw design	Screw diameter (mm)	Relative length L/D	Speed (rpm)	Main motor power (kW)	Purpose	Output (kg/h)
monolithic	2 x (60 – 90)	25 – 40	25 – 70	30 – 110	gas foaming PS, PE	Depending on the process and the material
segmented	2 x (50 – 100)	32 – 48	300 – 900	110 – 320	compounding	

Cylindrical extruders are made with concurrent and counter-rotating screws. They are designed for extrusion of granulates and regranulates, profiles, and pipes, as well as for extrusion of gas-foamed plastics.

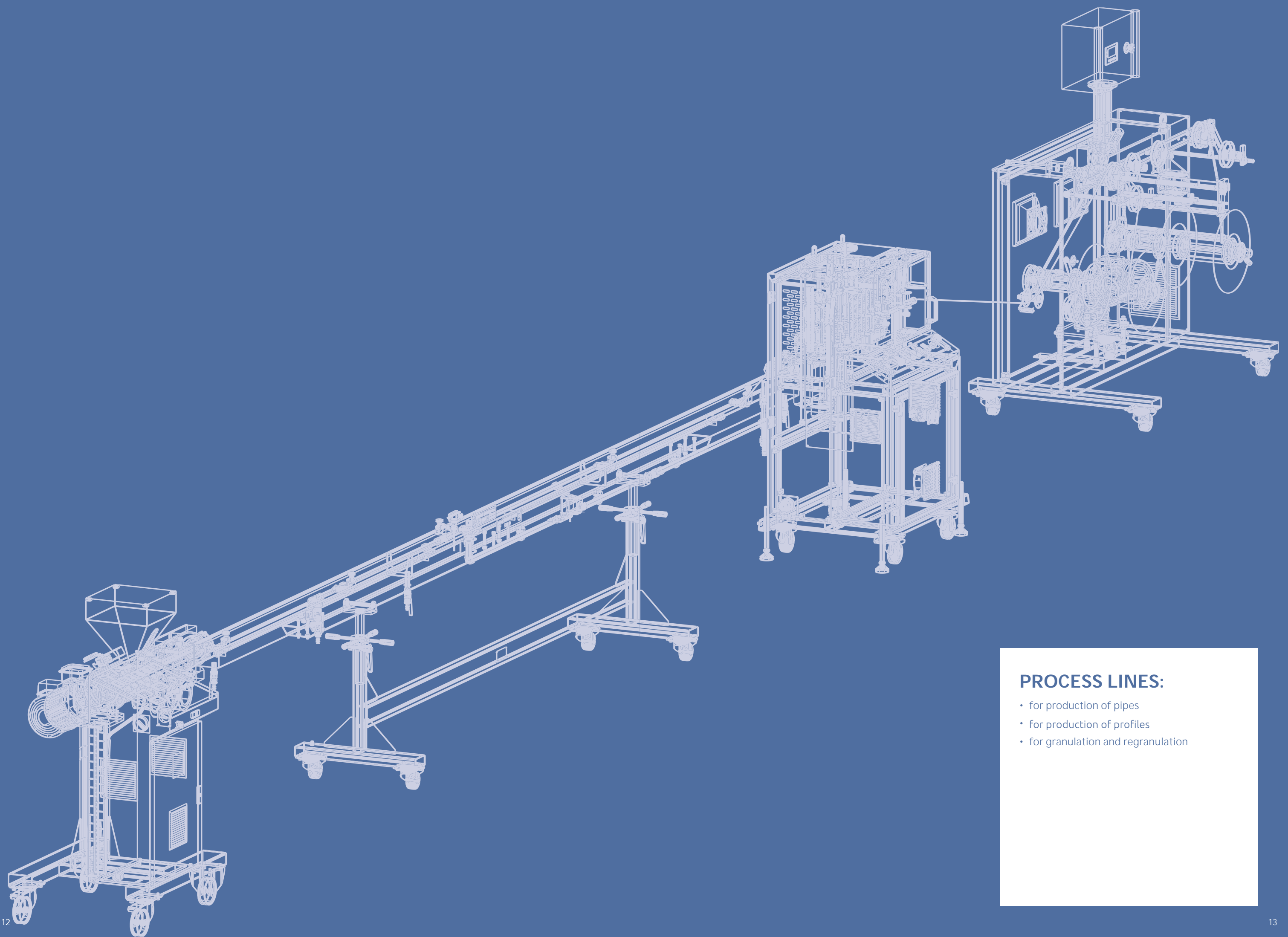


Energy-efficient extruders designed primarily for PVC processing

TECHNICAL DATA (range):

Plasticizing system	Screw diameter (mm)	Relative length L/D	Screw speed (rpm)	Main motor power (kW)	Standard thermoregulation	Output (kg/h)
conical	2x (90/45 – 170/90)	–	28 – 40	22 – 125	Electrical heating air cooling, internal screw thermoregulation	40 – 800 ¹⁾
cylindrical	2 x (60 – 140)	18 – 26 (32)	20 – 40	22 – 125		50 – 1200 ¹⁾

¹⁾ depending on the screw diameter and type of material



PROCESS LINES:

- for production of pipes
- for production of profiles
- for granulation and regranulation

PROCESS LINES FOR PRODUCTION OF PIPES

Depending on the type (design) of the manufactured pipe and its applications, the line can be combined on the basis of one or more single- or double-screw extruders.

ICHEMAD Profarb will deliver it with a head, a set of calibration and cooling trays (or with a moulding machine/corrugator), and an extractor and cutting device, with a rewinder or with a dispenser.

Consequently our lines can be used to extrude:

- smooth pressure and sewer pipes made of PVC, PE, or PP (up to 400 mm),
- corrugated drainage pipes (up to 200 mm) and electrical installation pipes made of such materials as PVC, PP, or PA,
- double-walled pipes with corrugated outer walls made of HDPE,
- corrugated protective pipes for power supply cables, and
- other pipes for special applications.



PROCESS LINES FOR PRODUCTION OF PROFILES

ICHEMAD-Profarb's offer includes:

- lines based on dual-screw extruder designed for extrusion of large profiles made from dry-blend PVC and gas-foamed PS and PE,
- lines based on single-screw extruders for production of small and medium-sized profiles from PVC in granulated form and from plastics such as PE, PS, PC, PMMA, and others.

Each of these lines will be equipped with a calibration and cooling table, an extractor with a cutting device (saw or guillotine), and a dispensing device or a profile rewinder.

It can be equipped, apart from the main extruder, with one or more coextruders.



PROCESS LINES FOR GRANULATION AND REGRANULATION

Process lines of this kind include the following two basic groups:

- lines with a dual-screw extruder for converting dry blended PVC into granulate or for recycling of prepared, ground PVC waste, using the hot cutting method and air transport and cooling of the granulate,
- lines for regranulation (recycling) of such plastics as PE, PP, PS, ABS, most masterbatches, etc., based on a single-screw extruder, which cut granulate in a water ring and dry it by separating water in centrifuge dryers

Also, in special cases (e.g. PMMA granulation), ICHEMAD-Profarb

can prepare a line for "thread" granulation in which the "threads" coming out of the head are immersion-cooled in a water bath and, once they are dried, they are cut in a granulator with a rotary cutter. In all plastics recycling cases, the process line is equipped with a plastic filter whose type is selected according to the type of raw material and the specific parameters of the process.

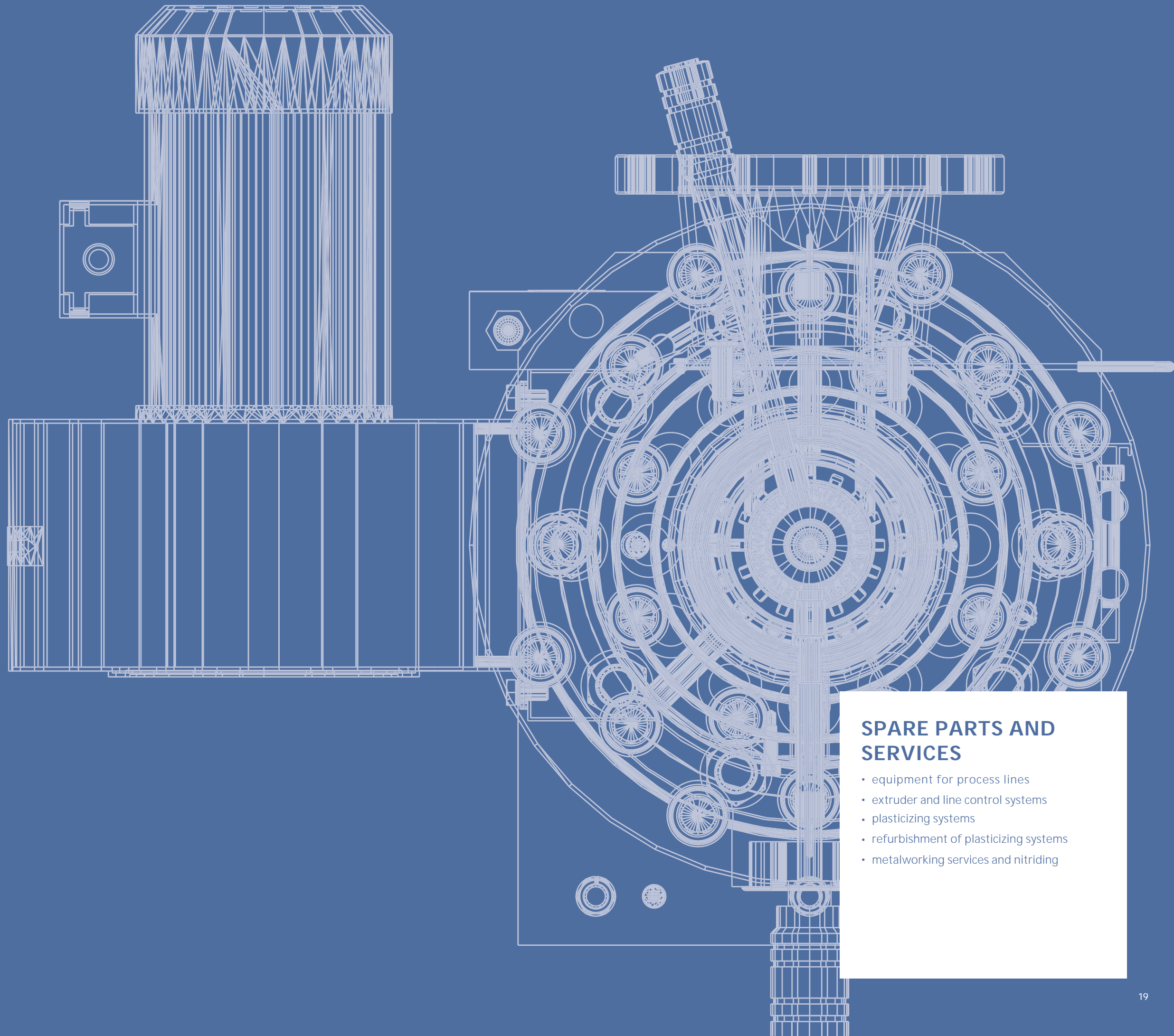


Hot granulation plate



Hot granulation head assembly





SPARE PARTS AND SERVICES

- equipment for process lines
- extruder and line control systems
- plasticizing systems
- refurbishment of plasticizing systems
- metalworking services and nitriding

EQUIPMENT FOR PROCESS LINES

In addition to extruders and complete process lines, we also offer special equipment, such as drainage hole cutters for double-wall pipes (up to 400 mm), a two-stand film rewinder and, if agreed individually, any piece of equipment (an extruder or a component) for any process line. Such equipment can be a perfect complement to lines operated by plastics processor companies.



EXTRUDER AND LINE CONTROL SYSTEMS

The control systems are completely designed and made in the ICHEMAD Profarb plant, usually as an assembly with an extruder as its key component. In each case, the primary task of the control system is to make sure that the extrusion process is as precise as possible, but easy to use, almost intuitive.

For this purpose, depending on the client's expectations and the requirements of the process, it is possible to use a control system that is based on individual PID temperature controllers or to use a PLC that enables full visualization and reporting of the extrusion process parameters.



PLASTICIZING SYSTEMS

As a manufacturer of extruders and process lines for plastics processing, ICHEMAD Profarb offers a wide range of spare parts, the most important of which are plasticizing systems for extruders made by us and by other companies.

We offer manufacture of just extruder screws of different geometry, cylinders, and complete plasticizing systems.

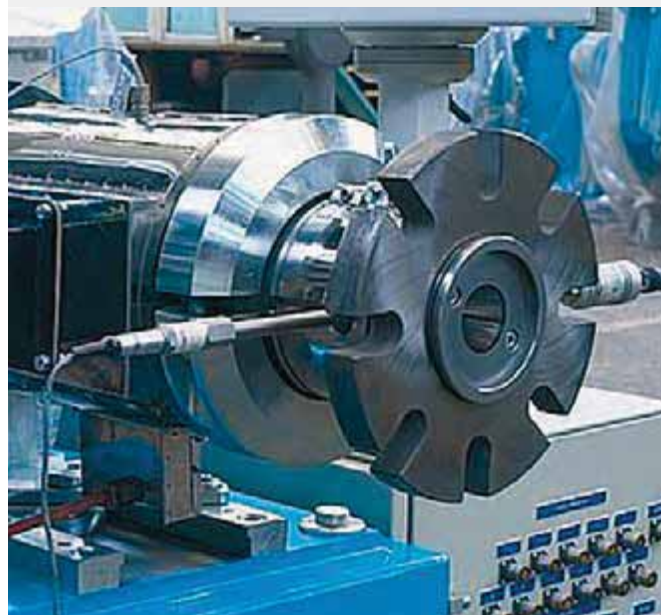
In addition to the standard design of cylinders and screws in the gas nitriding technology, it is possible to make bimetallic plasticizing systems with

plasma-welded screws (PTA) and to use other steels, e.g. increased-strength or corrosion-resistant steels, to make screws and/or cylinders.

Due to the high quality of the spare parts manufactured by us and their long service life, ICHEMAD-Profarb has for years been a valued partner of leading companies in the plastics industry both domestically and abroad



Conical interlocking screws (a complicated technical solution in the machine)



Plasticizing system of a conical extruder



REFURBISHMENT OF PLASTICIZING SYSTEMS

We also offer refurbishment of screws and cylinders. We perform welding of the top parts of screw coils with stellite powders in order to rebuild them.

Cylinders are refurbished by honing the hole so that the resulting cylindrical surface is homogeneous, and then the cylinder is nitrided to achieve the appropriate hardness and wear resistance.

The scope of refurbishment is always determined individually, depending on the degree of wear and the type of raw material being processed.



METALWORKING SERVICES AND NITRIDING

ICHEMAD-Profarb's machinery and technical equipment allows it to perform a wide range of thermo-chemical treatment operations and machining in small-volume and unit production not only for its own needs, but also for third parties.

In particular, we can offer:

- (axial) drilling of deep holes, $\text{Ø}10 - 165 \text{ mm}$, $L_{\text{max}} = 5,000 \text{ mm}$ (depending on diameter),
- honing of cylindrical and conical holes,
- milling and drilling operations on CNC machine tools, including making of external splines,
- grinding of shafts with the max. dimensions of $\text{Ø} 600 \times 4,750 \text{ mm}$ and weight up to 3,000 kg,

- gaseous nitriding in Poland's largest soaking pit with the dimensions of $\text{Ø}800 \times 5,000 \text{ mm}$, with process time equal to 96 hours,
- other (turning, grinding of holes, chiselling, carbonizing), after agreeing on the details.





CONTACT DETAILS

Main office:
ICHEMAD – Profarb Sp. z o.o. ul.
Chorzowska 117
44-100 Gliwice, Poland
Tel.: +48 32 270 45 41
Fax: +48 32 231 46 41
info@ichemad.com
sales@ichemad.com
www.ichemad.com

The needs of our clients are taken care of by specialists who are involved in all stages of cooperation, from design to construction and installation. They form a special team that supports our clients from the very first contact. The high qualifications and many years of experience of the team members are a guarantee of successful cooperation and selection of optimal technological solutions tailored individually to the needs of each client. As a result, our clients can be sure that the extruders and process lines they have ordered meet all the requirements necessary to make the final product from the raw material being processed.

Please send your enquiries to: sales@ichemad.com

We are a global company.
We will answer your questions in any language
within 48 hours.

