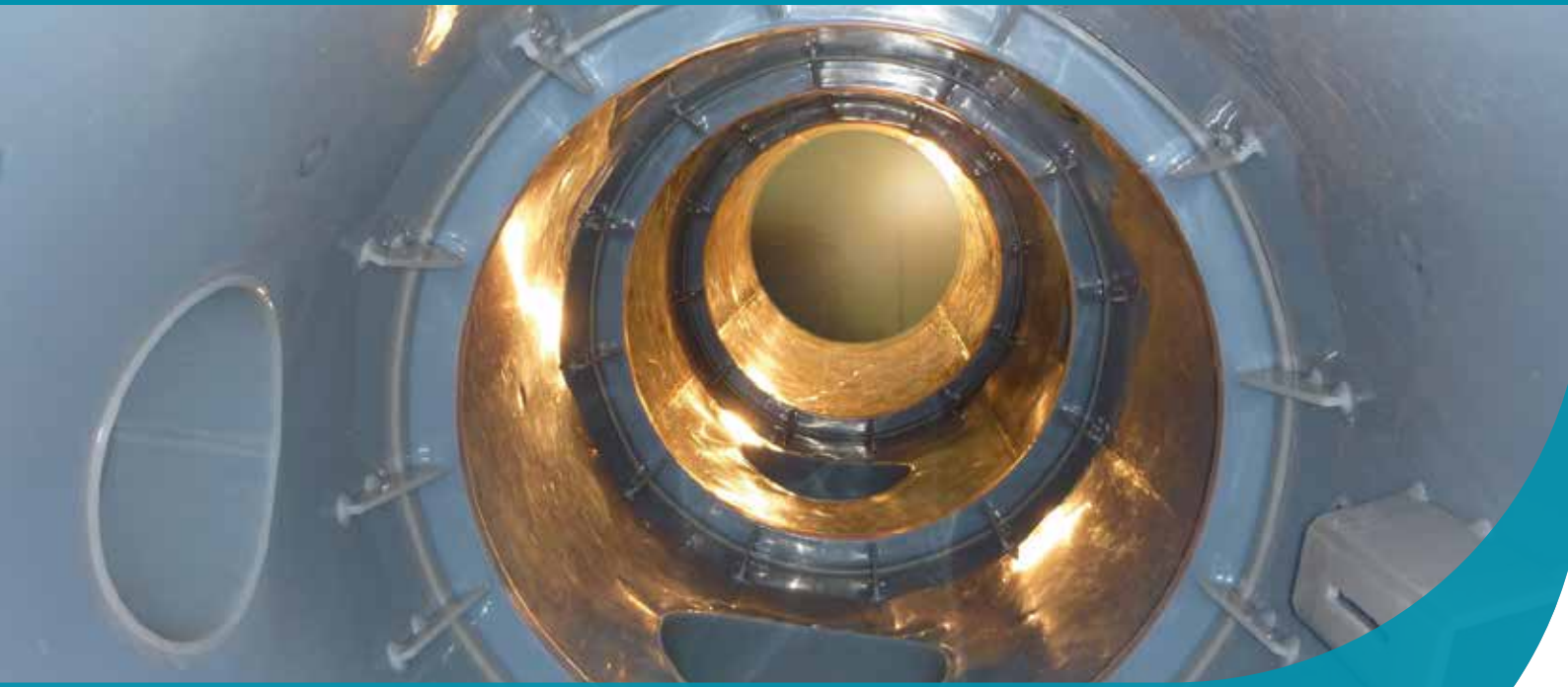


# SEMI- FINISHED PRODUCTS

MADE OF PE, PP, PVDF,  
ECTFE, FEP, PFA





# The Plastics Experts.

The AGRU success story already spans seven decades. Founded in 1948 by Alois Gruber sen., the company is now counted among the most important comprehensive suppliers for piping systems, semi-finished products, concrete protective liners and geomembranes made of engineering plastics. The fact that we provide everything as a single source supplier distinguishes us from many competitors. We process exclusively high-quality thermoplastic materials. And when it comes to problem-solving expertise for material selection and installation, we are your best partner.

## Universal scope of applications

Application areas include water and gas infrastructure, the energy sector, chemical and heavy industries, semiconductor and life-sciences, tank and apparatus building, naval and aviation industries, civil engineering and mining, building construction. The possibilities opened up by AGRU products are manifold, just as the requirements of the worldwide customers are diverse.



**FM Approvals  
Listed 4910  
Cleanroom Material**

## Quality

AGRU maintains a quality management system according to the ISO 9001:2015 standard, as well as an environmental management system according to the ISO 14001:2015 standard and the safety and health management system according to the ISO 45001:2018 standard. Additionally the products comply with international standards and are monitored and evaluated by independent testing agencies on a regular basis.

The start-to-finish attention to quality ensures that the products meet the strictest technical specifications and ensure the safe operation of equipment and tanks. Some AGRU products comply with the EU-Regulations No. 10/2011 on plastic materials and articles intended to come in contact with food.

# SEMI-FINISHED PRODUCTS for high-end apparatus, vessel and tank construction

The AGRU product range is distinguished by a unique variety of products and materials. All our sheets, round bars, welding rods or liner pipes are available in everything, from standard up to high-performance plastics. Solutions and finished parts for any application can be realized with our pressed and extruded sheets, fabric backed sheets, round bars, hollow bars, fabric backed pipes and welding rods made of PE, PP, PVDF, ECTFE, FEP and PFA. In addition to our standard portfolio of plastic semi-finished products, many specialised products are available upon request.

## Extruded sheets

**Consistently high quality thanks to years of experience in extrusion technology**

Depending on the type of plastic, AGRU offers different extrusion sizes for cost-optimised production.

Special features of our product range are:

- Electrically conductive sheet products made of **PE 100-el, PP-s-el, PVDF-el, or PFA-el**
- We also offer more cost-effective alternative PVDF types
- Extruded thick PFA sheets up to a thickness of 15 mm
- Stress crack resistant sheets made of PE 100-RC up to a thickness of 50 mm

## Fabric backing sheets

**Chemically resistant fabrics made of various materials (polyester-, synthetic- and glass fabric)**

There is an optimal long-lasting solution for each application:

- due to the production of PE, PP, PVDF, ECTFE, FEP, and PFA fabric backed sheets
- thanks to the high acid and high hydrolysis resistance of the synthetic fabric
- due to easy handling provided by thermoformability
- because AGRU utilises a proven method for the embedding of the fabrics in the plastic material

## Round bars, blocks and pressed sheets

**Thanks to the wide range of dimensions and materials, mechanically manufactured parts can be produced cost-effectively.**

AGRU has an extensive product range:

- Extruded blocks made of PE and PP in thicknesses up to 120 mm and PVDF up to 100 mm.
- The pressed sheets in the formats 2 m x 1 m or 4 m x 2 m are suitable for the production of low-stress milled parts.
- AGRU offers a comprehensive delivery program for solid bars in the materials listed below.
  - ECTFE and PFA round bars up to 100 mm diameter
  - PE 100-RC and PP-R round bars with a maximum diameter of 640 mm
  - High-purity PVDF Solef® round bars up to a diameter of 340 mm

## Liner pipes

**Time- and cost-saving installation with AGRU liner pipes made of PVDF, ECTFE, FEP and PFA**

AGRU offers special liner pipes for the lining of FRP liner pipes. While the FRP structure provides the necessary stiffness, the liner pipe provides the chemical resistance for the application. All liner pipes manufactured by AGRU are equipped with a specially modified surface to ensure the best possible bond between the plastic and the FRP:

- PVDF HV liner pipes and fittings with a special, thermo-chemically modified and rough surface
- Fabric backed pipes in lengths of 1 m and 5 m made of ECTFE, FEP and PFA



## AGRU semi-finished plastic products

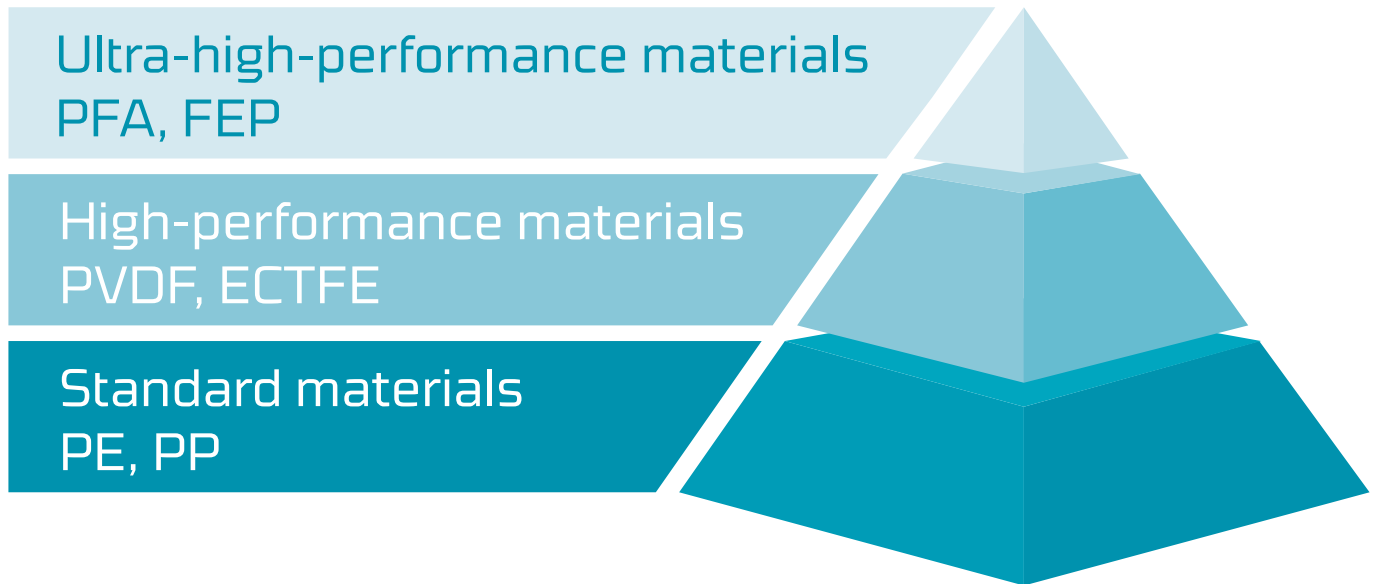
### Chemical-resistant semi-finished sheets, pipes, bars and welding rods

Semi-finished products made of thermoplastics are an excellent and durable solution for modern, high-quality apparatus and tank construction, and also for manufacturing wear-resistant products. In the chemical and heavy industries, and in plant construction, a variety of material requirements exist. These include resistance to acids and lyes, resistance in a wide temperature range, low static charging in potentially explosive atmospheres (ATEX) and many other demands.

DVS codes provide information about established joining methods and welding parameters. Users can choose from various proven methods, such as extrusion welding, hot-gas welding and butt welding. Also for machining, thermoforming and tank constructions established procedures are available.



# Highest chemical resistance



A permanently resistant plastic is available for almost every medium



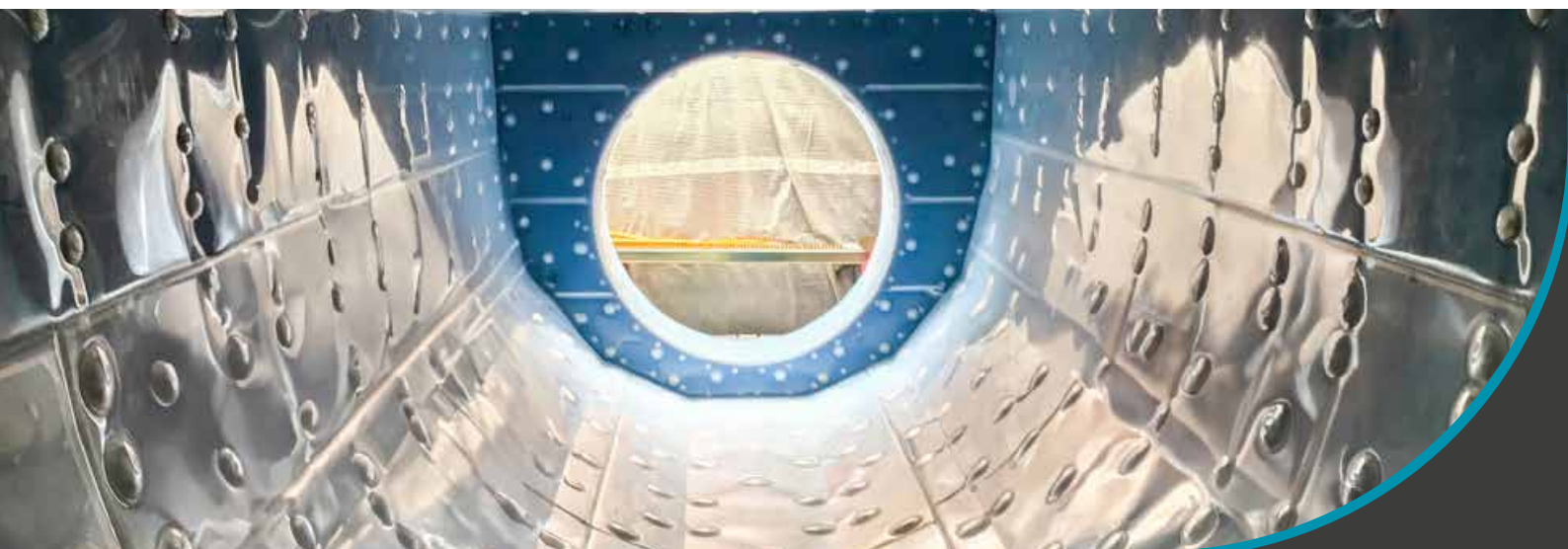
Thanks to consultation and material recommendations by The Plastics Experts



AGRU solutions provide operational safety through their innovative and reliable products



The industrial application determines the optimal and reliable material





## PE

### Resistance to slow crack growth

AGRU plastic products made of PE 100-RC are characterised by a very high resistance to slow crack growth, great toughness and very good chemical resistance. PE is usually used between -40 °C and +60 °C. Other characteristics include good wear resistance, excellent electrical insulation and high vibration damping. Adding special carbon black types (approx. 2%) ensures light and weather resistance. In addition to industrial applications, polyethylene is used in particular for water supply. Whether drinking, cooling, hot, industrial or waste water. PE offers the ideal solution and has proven itself over many years.

|                                                  | PE 100-RC<br>black<br>[mm] | HDPE<br>natural<br>[mm] | PE 100-el<br>black<br>[mm] | HDPE<br>black<br>[mm] | HDPE<br>blue<br>[mm] |
|--------------------------------------------------|----------------------------|-------------------------|----------------------------|-----------------------|----------------------|
| <b>Blocks</b>                                    |                            |                         |                            |                       |                      |
| 1000 x 620                                       | 50 - 120                   |                         | 50 - 120                   |                       |                      |
| <b>Extruded sheets</b>                           |                            |                         |                            |                       |                      |
| 2000 x 1000                                      | 3 - 40                     | 3 - 10                  | 3 - 20                     |                       |                      |
| 3000 x 1500                                      | 3 - 50                     | 3 - 25                  | 5 - 15                     | 3 - 30                |                      |
| 4000 x 2000                                      | 3 - 40                     |                         |                            |                       | 5 - 30               |
| <b>Pressed sheets</b>                            |                            |                         |                            |                       |                      |
| 2000 x 1000                                      | 10 - 120                   | 10 - 80                 | 25 - 60                    |                       |                      |
| 4000 x 2000                                      | 15 - 60                    | 15 - 60                 |                            |                       |                      |
| <b>Polyester fabric backed sheets</b>            |                            |                         |                            |                       |                      |
| 3000 x 1500                                      | 4 - 5                      |                         |                            |                       |                      |
| <b>Round bar</b>                                 | 15 - 640                   |                         | 50 - 160                   |                       |                      |
| <b>Welding rod round, 3 kg roll</b>              | 3 - 5                      | 3 - 4                   | 3 - 4                      |                       | 3 - 4 (PE 80)        |
| <b>Welding rod triangular rounded, 3 kg roll</b> | 5 x 3                      |                         |                            |                       |                      |

Other dimensions available on request.

Range also available in PE 100 on request.

Extruded sheets made of HDPE black are a cost-efficient alternative for applications, where no static design/calculation is required.

AGRU offers blue HDPE sheets (similar to RAL 5012) in special for drinking water applications. These semi-finished products are tested according to KTW/EN16421/ÖVGW W1.830.

# PP

## Greater rigidity and temperature resistance

Polypropylene (PP) is a partly semi-crystalline thermoplastic similar to HDPE, but with higher stiffness, strength and hardness levels. It is also characterised by very good chemical resistance. Polypropylene can be used up to a maximum temperature of 95 °C. However, below freezing point, PP is sensitive to impact (the use of plastic materials like this at temperatures below -5 °C should be avoided). PP is often used, for example, in pickling plants, the chemical industry and for highly aggressive wastewater, because chemicals at high temperatures are used in these areas. AGRU's product range includes various PP polymer types: PP homopolymer (PP-H), PP random copolymer (PP-R), PP blockcopolymer (PP-C), flame-retardant polypropylene (PP-s) and flame-retardant, electrically conductive polypropylene (PP-s-el).



|                                                  | PP-H<br>grey<br>RAL 7032<br>[mm] | PP-R<br>grey<br>RAL 7032<br>[mm] | PP-C (B)<br>grey<br>RAL 7032<br>[mm] | PP<br>natural<br>[mm] | PP<br>white<br>[mm] | PP-s<br>grey<br>RAL 7037<br>[mm] | PP-s-el<br>black<br>[mm] |
|--------------------------------------------------|----------------------------------|----------------------------------|--------------------------------------|-----------------------|---------------------|----------------------------------|--------------------------|
| <b>Blocks</b>                                    |                                  |                                  |                                      |                       |                     |                                  |                          |
| 1000 x 620                                       |                                  | 50 - 120                         | 50 - 120                             |                       |                     |                                  | 50 - 120                 |
| <b>Extruded sheets</b>                           |                                  |                                  |                                      |                       |                     |                                  |                          |
| 2000 x 1000                                      | 3 - 40                           |                                  |                                      | 3 - 6                 |                     | 3 - 10                           | 3 - 20                   |
| 3000 x 1500                                      | 3 - 40                           |                                  | 3 - 20                               | 8 - 25                | 6 - 20              | 3 - 20                           | 4 - 15                   |
| 4000 x 2000                                      | 3 - 40                           | 40 - 50                          |                                      |                       |                     |                                  |                          |
| <b>Pressed sheets</b>                            |                                  |                                  |                                      |                       |                     |                                  |                          |
| 2000 x 1000                                      | 10 - 60                          | 70 - 120                         |                                      | 10 - 60               |                     | 25 - 40                          | 20 - 40                  |
| 4000 x 2000                                      | 15 - 60                          |                                  |                                      | 15 - 60               |                     |                                  |                          |
| <b>Polyester fabric backed sheets</b>            |                                  |                                  |                                      |                       |                     |                                  |                          |
| 3000 x 1500                                      | 3 - 6                            |                                  |                                      |                       |                     |                                  |                          |
| 25000 x 1500                                     | 3 - 4                            |                                  |                                      |                       |                     |                                  |                          |
| <b>Glass fabric backed sheets</b>                |                                  |                                  |                                      |                       |                     |                                  |                          |
| 3000 x 1500                                      |                                  | 5                                |                                      |                       |                     |                                  |                          |
| <b>Round bar</b>                                 |                                  | 15 - 640                         |                                      |                       | 70 - 150            |                                  | 20 - 100                 |
| <b>Welding rod round, 3 kg roll</b>              | 3 - 5                            | 3 - 5                            | 3 - 4                                | 3 - 4                 | 3 - 4               | 3 - 4                            | 3 - 4                    |
| <b>Welding rod round, 10 kg roll</b>             | 3 - 4                            |                                  |                                      |                       |                     |                                  |                          |
| <b>Welding rod round, 1 m rod</b>                | 3 - 4                            |                                  |                                      |                       |                     |                                  |                          |
| <b>Welding rod triangular rounded, 3 kg roll</b> | 5 x 3 /<br>6 x 4                 |                                  |                                      |                       |                     | 5 x 3                            |                          |
| <b>Welding rod oval, 3 kg roll</b>               | 5 x 3 /<br>6 x 4                 |                                  |                                      |                       |                     |                                  |                          |

Other dimensions available on request

## PVDF

### Ideally suited for chemicals and high purity applications

AGRU PVDF is a highly crystalline non-reinforced plastic that combines good mechanical, thermal and electrical properties with excellent chemical resistance. PVDF can be processed without additives, resulting in excellent leaching behaviour. This makes this plastic the ideal material for high-end applications in the semiconductor, pharmaceutical, life sciences and photovoltaic industries. Fields of application for these products include pipeline systems, storage and transport tanks and apparatuses requiring high media purity and leaching behaviour standards. Electrically conductive PVDF-el is used specifically in the electrical industry and explosion protection areas. PVDF Flex is characterised by its additional flexibility, especially for bonded systems on steel.

|                                       | PVDF<br>[mm] | PVDF -<br>Flex<br>[mm] | PVDF-el<br>[mm] |
|---------------------------------------|--------------|------------------------|-----------------|
| <b>Extruded blocks</b>                |              |                        |                 |
| 1000 x 610                            | 40 - 100     |                        |                 |
| <b>Extruded sheets</b>                |              |                        |                 |
| 2000 x 1000                           | 2 - 25       |                        |                 |
| 3000 x 1500                           | 3 - 10       |                        | 3 - 8           |
| <b>Pressed sheets</b>                 |              |                        |                 |
| 2000 x 1000                           | 10 - 40      |                        | 10 - 40         |
| <b>Polyester fabric backed sheets</b> |              |                        |                 |
| 3000 x 1500                           | 3 - 5        |                        |                 |
| 25000 x 1500                          | 2 - 4        |                        |                 |
| <b>Fabric backed sheets SK+</b>       |              |                        |                 |
| 3000 x 1500                           | 3 - 4        | 2,3                    | 3 - 4           |
| 10000 x 1500                          | 3 - 4        | 2,3                    |                 |
| <b>Round bar*</b>                     | 10 - 340     |                        | 20 - 200        |
| <b>Hollow rod</b>                     | 20 - 45      |                        |                 |
| <b>Welding rod round</b>              | 3 - 4        | 3 - 4                  | 3 - 4           |
| <b>Welding rod triangular</b>         | 5 x 3        |                        |                 |
| <b>Pipe (5 m)</b>                     |              |                        | 32 - 400        |
| <b>HV-Liner</b>                       |              |                        |                 |
| Pipe (5 m)                            | 20 - 400     |                        | 32 - 400        |
| Bend                                  | 20 - 200     |                        |                 |
| Tee                                   | 20 - 200     |                        |                 |
| Reduction                             | 63 - 160     |                        |                 |

Other dimensions available on request

## ECTFE

### Excellent chemical resistance to acids, lyes and solvents

ECTFE has a unique combination of properties that are a result of its chemical structure - a copolymer with an alternating arrangement of ethylene and chlorotrifluoroethylene. ECTFE has excellent resistance to degradation by heat, strong radiation and weathering. Compared to PVDF, ECTFE is characterized by even better chemical resistance, especially in alkaline solutions and at higher temperatures. ECTFE is highly impact resistant and shows virtually no change in properties over a wide temperature range, making it particularly suitable for demanding industrial applications. The excellent welding properties and thermoplastic formability enable simple and cost-saving processing both in the workshop and on site.

|                                       | ECTFE<br>[mm] |
|---------------------------------------|---------------|
| <b>Extruded sheets</b>                |               |
| 2000 x 1250                           | 4 - 15        |
| 3000 x 1500                           | 2,3 - 4       |
| <b>Pressed sheets</b>                 |               |
| 2000 x 1000                           | 10 - 50       |
| <b>Fabric backed sheets SK+</b>       |               |
| 2000 x 1250                           | 0,5           |
| 3000 x 1500                           | 2,3 - 3       |
| 15000 x 1500                          | 2,3 - 3       |
| <b>Glass fabric backed sheets GGS</b> |               |
| 3000 x 1500                           | 2,3 - 3       |
| 15000 x 1500                          | 2,3 - 3       |
| <b>Round bars</b>                     | 20 - 100      |
| <b>Welding rod round</b>              | 3 - 4         |
| <b>Pipes SK+ (1 m / 5 m)</b>          | 20 - 200      |

Other dimensions available on request

# FEP

## Highest corrosion resistance

FEP, which belongs to the fully fluorinated plastics group, offers outstanding corrosion resistance. FEP performs reliably over the enormous range of temperatures between -190 °C and +205 °C, and can therefore be used in numerous industrial applications. Flexibility, thermoformability and optimum welding properties mean that AGRU FEP products can be manufactured reliably at low costs. Like PFA, FEP is resistant to almost all chemicals. The plastic is also extremely weather and radiation resistant.

|                                       | FEP<br>[mm] |
|---------------------------------------|-------------|
| <b>Extruded sheets</b>                |             |
| 15000 x 1250                          | 1,5 - 2,3   |
| <b>Glass fabric backed sheets GGS</b> |             |
| 2000 x 1250                           | 0,8 - 2,3   |
| 10000 x 1250                          | 2,3         |
| 15000 x 1250                          | 1,5         |
| <b>Welding rod round</b>              | 3,5 - 4,5   |
| <b>Pipes (5 m)</b>                    | 32 - 160    |
| <b>Pipes GGS (1 m / 5 m)</b>          | 32 - 160    |

Other dimensions available on request

# PFA

## The king of plastics

PFA is the highest grade plastic that AGRU has in its portfolio. It combines the outstanding chemical resistance with the excellent processability of standard plastics. Resistance to almost any medium and the widest thermal operating range between -190 °C and +260 °C enable an extremely wide range of applications. This means that a solution can also be offered for extreme chemicals at high temperatures. Many PFA products are also available in High Purity (HP) quality. The high purity quality enables applications in the semiconductor, pharmaceutical and food industries.

|                                       | PFA<br>[mm] | PFA HP<br>[mm] |
|---------------------------------------|-------------|----------------|
| <b>Extruded sheets</b>                |             |                |
| 2000 x 1000                           | 12 -15      | 12 - 15        |
| 2000 x 1150                           | 10          | 10             |
| 2000 x 1250                           | 2,3 - 6     | 4 - 6          |
| 10000 x 1250                          | 2,3         |                |
| 20000 x 1250                          | 1,5         |                |
| <b>Glass fabric backed sheets GGS</b> |             |                |
| 2000 x 1250                           | 0,8 - 2,3   |                |
| 10000 x 1250                          | 1,5 - 2,3   | 2,3 - 3        |
| <b>Round bars</b>                     | 20 - 100    |                |
| <b>Welding rod round</b>              |             | 3 - 4,5        |
| <b>Pipes (5 m)</b>                    | 32 - 110    |                |
| <b>Pipes GGS (1 m / 5 m)</b>          | 32 - 110    |                |

Other dimensions available on request

# PE 100-el, PP-s-el and PVDF-el

## Antistatic equipment increases safety in hazardous environments

When filling, emptying, stirring, mixing, or spraying flammable media, the electrostatic charging of the pipeline and containers must be prevented. If the pipeline passes through an explosive atmosphere, it can be ignited by a single spark discharge, causing an explosion. Electro-Static Discharge (ESD) plastics from AGRU provide additional safety by controlling and permanently dissipating electrostatic charges. They are used in chemical plants (e.g. ATEX) in areas where spark formation due to electrostatic charging must be prevented due to explosion protection requirements.

(ESD materials are identified by the suffix "-el")

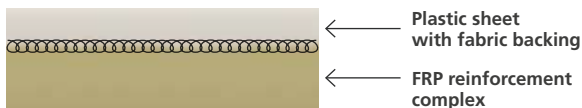




## Lining material

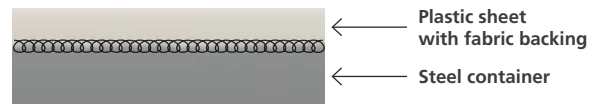
### FRP dual laminate

Tanks made of fibre-reinforced plastic (FRP) are lined with fabric backed sheets to maintain chemical resistance and leak-tightness. Such tanks, boilers, reactors, and scrubbers are then suitable for operation under vacuum and pressure up to 180 °C (depending on material and chemical).



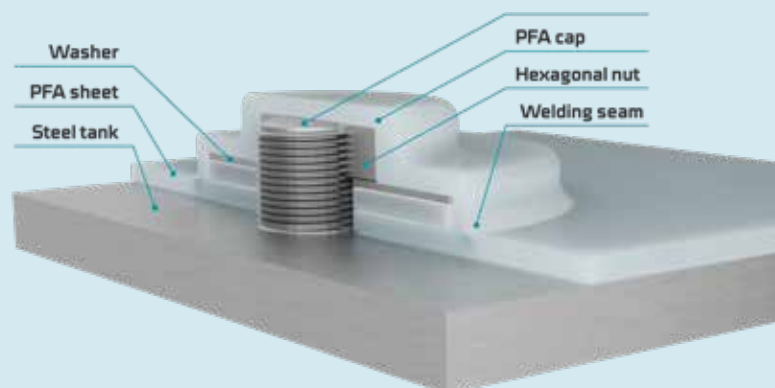
### Steel lining (fully bonded)

A fully bonded lining made of fabric backed sheet materials applied to steel provides a long-term chemical resistance at temperatures up to 120 °C (depending on material and chemical) for storage and shipping containers, reactors, centrifuges and related equipment. Steel lining is especially suitable for high pressure applications.



### Fixpoint lining

AGRU PFA sheets can be fastened to steel tanks by using mechanical fix points such as clamps, bolts, or screws. This PFA lining system is mainly used for flue gas applications and desulphurization systems at temperatures up to 260 °C.



# HV-Liners and fabric backed pipes

## Custom-tailored piping systems for any application

AGRU offers special liner pipes for FRP applications. Whilst the FRP structure provides the necessary stiffness, the liner pipe provides the chemical resistance for the application. That way custom-tailored pipes can be produced for any application:

- high bonding strength between the laminate and the FRP-resin system (DIN 16964)  $> 5 \text{ N/mm}^2$
- flangeless FRP pipe connections minimise maintenance costs
- low weight of the entire piping system
- saves material costs compared to solid-wall piping

### HV-Liner



The PVDF HV-Liner from AGRU is an economical alternative to traditional fabric backed pipes. The surface-treated PVDF pipe has a three-dimensional surface structure which provides an optimal bonding to the FRP structure. The piping systems are available in PVDF, PVDF-FLEX, and PVDF-el. The pipes can be produced in diameters from 20 – 400 mm.

AGRU is now able to apply the special surface treatment of the pipes also to injection moulded fittings (OD 20 - 200 mm).

### SK+ and GGS lamina-ted pipes



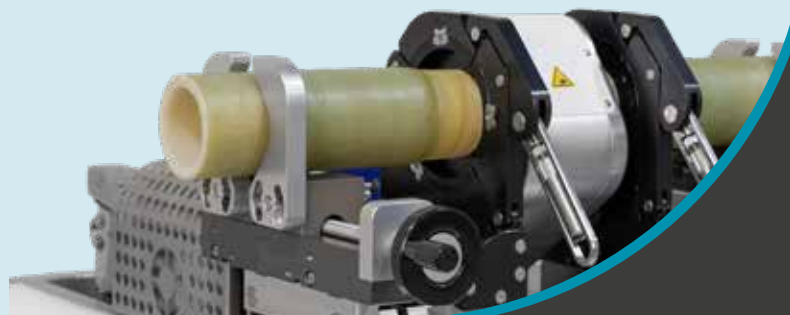
The fabric backed pipes are available in ECTFE, FEP and PFA. AGRU GGS glass fabrics are the standard for FEP and PFA. For ECTFE, SK+ is the preferred solution.

## Flexible clamping system for welding GRP dual laminate pipes

The innovation for welding laminated pipes makes it possible to apply the proven AGRU IR welding technology to GRP dual laminate pipes. A clamping system has been developed that enables GRP dual laminate pipes with different outer diameters to be clamped and the inner thermoplastic pipe to be welded reliably using the AGRU SP 110S V3 and V3.1 welding machines.

The system comprises a flexible external clamping jaw system that adapts to the external diameter of the GRP pipes, as well as internal clamping jaws that are matched to the diameter of the AGRU pipes. The entire clamping system is supplied in a case and can be converted in a few simple steps.

When the system is purchased, a license is activated which activates an additional menu field for welding liner pipes. Using specially developed welding parameters, all AGRU liner pipes, such as PVDF HV liner, ECTFE SK+, FEP and PFA GGS pipes up to OD 110 mm, can be welded. The standardized documentation guarantees the complete traceability of each weld seam, both digitally and by means of a label directly on the weld.





## Semiconductor and pharmaceutical industry

The semiconductor and pharmaceutical industries place enormous demands on materials and manufacturing processes, including the highest levels of quality, safety and purity. AGRU's many years of experience in these applications means that we are well aware of the challenges. As a result, AGRU offers a wide range of products with the required quality for these applications. Using proven materials and process technologies, AGRU creates tailor-made solutions for semiconductor and pharmaceutical industry where there is no room for error.

## Transport tanks

Large number of tank trucks travel around the world to meet the ever-increasing demand for chemical products. Some of the media transported are aggressive acids such as sulphuric acid, hydrochloric acid, nitric acid or caustic soda. As most of these media are 'dangerous goods', these transporters are subject to high safety standards. Due to their chemical resistance and easy cleanability, fabric backed PE 100-RC, ECTFE, FEP and PFA sheets are ideal for lining ISO steel containers or FRP dual containers. Fabric backed PFA HP sheets are in particular often used for the transport of high purity media.

## Storage tanks

AGRU semi-finished sheets are frequently used in the manufacturing of storage tanks due to their excellent resistance to a wide range of media (e.g. sulphuric acid, hydrofluoric acid, nitric acid, caustic soda, etc.). A distinction is made between solid storage tanks, which are usually made from AGRU PE 100-RC, PP or PVDF sheets. Fabric backed sheets are preferred for applications involving higher temperatures/pressures or more aggressive chemicals, which are installed in combination with an FRP or steel

structure. Additionally, some of our plastic products comply with common food regulations such as EU Food 10/2011 or FDA.

- Sulphuric acid storage tank
- PE 100-RC caustic soda storage containers
- PVDF fabric backed sheets for chromic acid baths
- AGRU PVDF used in acid tank construction





## Food applications

In today's food production industry, hygiene requirements are high. AGRU offers a wide range of solutions for different applications. AGRU semi-finished products meet the specific safety and performance requirements of the food industry. Already the raw materials used must meet the requirements (e.g. US Food and Drug Administration - FDA). AGRU's semi-finished products are also tested for food applications. Certificates of compliance with EU Directive 10/2011 confirm their suitability.

## Fish farming

Offshore fish farms nowadays use plastic tanks that float in the sea. These closed systems prevent faecal matter and feed residues from polluting the sea, unlike previous net systems. A well engineered chamber and pumping system, allows the fish to swim in the current, and the amount of food can be optimised. UV resistance, saltwater resistance, and impact resistance are important requirements for the plastic material. PE sheets meet all these requirements and are joined by butt and extrusion welding. In many cases, welded polyethylene pipes serve as buoyancy bodies. Additionally, pipelines are needed for water treatment and food transport.

## Flue gas applications

The flue gases produced during roasting and combustion processes are cleaned by downstream processes and fed to the chimney via flue gas ducts. Due to the high temperatures and corrosive nature of the flue gases, it is necessary to line these components with corrosion-resistant plastics. AGRU ECTFE SK+ sheets are often used as lining material due to their excellent chemical resistance

to sulphur containing flue gases and high operating temperatures (sometimes up to 120 °C). PFA can be used for even more demanding operating conditions (e.g. temperatures > 120 °C) or very large flue gas ducts. PFA fixed point lining is suitable for giving flue gas ducts long-term corrosion resistance, even at operating temperatures as high as 260 °C.





## Gas scrubbers and ventilation technology

Polluted exhaust air from the production of certain chemicals must be scrubbed before it can be released into the environment. Depending on the application, acidic or alkaline exhaust gases are brought into contact with a liquid stream, creating a very aggressive media mixture that can chemically attack unprotected system components. Depending on the operating conditions, gas scrubbers can be manufactured from solid AGRU semi-finished sheets made of PE 100-RC or PP. For higher operating temperatures or even more aggressive application conditions, fabric backed sheets made of PVDF, ECTFE, FEP or PFA are suitable. Those are often installed in FRP composite constructions (dual laminate) or inside steel structures.



## Metal surface treatment

Pickling is one of the most important pre-treatment steps in the production of high-quality metals. Aggressive inorganic acids such as hydrochloric acid, sulphuric acid, nitric acid, phosphoric acid, chromic acid or hydrofluoric acid are used. The metal is immersed and treated in the acid bath for a certain period of time. The temperature in the pickling process can reach up to 90 °C. For such applications, only polyolefin and fluoropolymer products are safe for long-term use. The choice of product depends on careful consideration of the operating conditions. The production, storage, transport, and use of chemicals and other hazardous materials inevitably pose potential risks. Containing such risks through rigorous safety management while ensuring efficiency and availability is a major challenge for the chemical industry. With AGRU's semi-finished products, these risks are minimised.



## Everything from a single source

### Comprehensive semi-finished product portfolio and extensive stock-keeping

The five application options for semi-finished plastic products are

- Tank construction (solid wall)
- Dual laminate constructions (FRP fabric backed lining)
- Bonding to steel
- Fix point lining
- Machining of custom parts for specific customer needs



## CUSTOMIZED PARTS

### Semi-finished products without limits

AGRU is a leading company in plastic processing. It manufactures special fittings and pipe isometries for plastic piping systems with outer diameters ranging from 20 mm to 3500 mm. Our process begins with technical consulting for plastic piping systems, followed by digital planning with BIM and CAD, and advanced engineering for special fabrications. With experience from thousands of projects, we have in-depth expertise in special radii and unique dimensions, allowing us to develop customized solutions of uncompromising quality.



[to the Landing Page  
CUSTOMIZED PARTS](#)

The wide range of available material types used to produce plastic piping systems, the expertise of our application engineers, off-site manufacturing, and a global logistics network make AGRU the ideal partner for state-of-the-art demanding plastic piping system projects. Tailor-made AGRU fittings are used in various industries, including water treatment plants, seawater desalination facilities, pumping stations, and ultrapure water systems.

By maintaining full control over the manufacturing process with state-of-the-art machinery, we deliver reliable high quality in both semi-finished and finished products—including flange connections, bends, wall penetrations, instrumentation connections, and reducers. This enables the safe and reliable operation of piping systems for industrial and infrastructure applications.





Your distributor

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1025

**agru Kunststofftechnik Gesellschaft m.b.H.**  
Ing.-Pesendorfer-Strasse 31  
4540 Bad Hall, Austria

T. +43 7258 7900  
F. +43 7258 790 - 2850  
office@agru.at

