

INDUSTRY

PIPING SYSTEMS
FOR INDUSTRIAL
APPLICATIONS





The Plastics Experts.

AGRU industrial piping systems have proven their value for decades in industrial plants around the globe. The various systems are characterised by outstanding operational reliability, easy installation and extremely low maintenance overheads. Be it leakage-monitored double contained piping systems, abrasion-resistant multilayer systems, or the ECTFE system, which is even resistant to nitric acid, AGRU has the best solution for virtually any industrial application in its portfolio.

The AGRU success story has been unfolding now for around seven decades. Founded back in 1948 by Alois Gruber senior, nowadays the company is one of the world's most important single-source suppliers for piping systems, semi-finished products, concrete protection liners and lining systems made from engineering plastics. Our ability to supply everything from a single source sets us apart. We use only top-grade thermoplastic polymers as our raw materials. When it comes to application-technical consulting, we are your best partner in the field.



Quality

At AGRU, customer satisfaction comes first. Technical consultations, training courses, welding instruction and expert supervision on site are essential parts. The AGRU quality assurance system is compliant with ISO 9001:2015 and its environmental management system fulfils ISO 14001:2015. This in turn ensures that the products comply with international norms, as monitored and evaluated on an ongoing basis by independent testing agencies standards.

The start-to-finish attention to quality ensures that the products meet and beat the strictest technical specifications, providing safe operation within gas, water and waste-water infrastructures.

Reliable plant operations for decades

The AGRU industrial piping system includes materials and pipe types for virtually any industrial application. Excellent chemical resistance and an extremely wide temperature application range make our industrial piping systems the ideal solution for pipework in plant, equipment and tank construction, and also in the petrochemicals industry.

Fast and easy installation

Pipes, fittings and customized solutions perfectly harmonized

Our strength lies in more than 50 years of experience and offers you

- carefully thought-out systems optimised down to the finest detail
- unique application technology advice from experts
- easy planning, fast installation and effective logistics

Maintenance-free pipework

Welded joints and materials for high operational reliability

Efficient and reliable operation of your plant thanks to

- durable and robust system components
- corrosion-free and extremely resilient plastics
- tried-and-trusted AGRU industrial piping systems

Double operational safety

The compact Poly-Flo double containment piping system is highly reliable

A media pipe and a protective pipe extruded in a single production step offer

- absolute operational safety thanks to a double containment pipe
- easy installation thanks to time-saving simultaneous welding
- a space-saving design and leakage monitoring of the annular gap

High media resistance

Pipes and fittings made from PE 100-RC/PP/PVDF/ECTFE

A product range that leaves no wish unfulfilled, including

- customised PE and PP types for special fields of application
- electrically conductive, flame-retardant and chemically resilient materials
- maximum acid and lye resistance



AGRU industrial piping systems developed by experts



PP-H/PP-R industrial piping systems

Plastic pipes and fittings made of PP-H and PP-R have proved their value for decades in every area of industry. Above all, excellent temperature and corrosion resistance ensure durability. PP is characterised by its superior strength, stiffness, hardness, and the temperature and chemical resistance these features ensure. PP can be used between $-5\text{ }^{\circ}\text{C}$ and $+95\text{ }^{\circ}\text{C}$.



Electrically conductive: HDPE-ESD-eI / PPS / PPS-ESD-eI

In plastic piping system building, electrically conductive piping must be used in areas with a risk of explosion. Electrically conductive plastics modified by the addition of carbon black guarantee that the known benefits of polyolefins, such as chemical resistance and easy processing and installation, are retained. However, the conductive carbon black does reduce the impact strength and creep strength.

Fluoroplastic systems

PVDF is a thermoplastic homopolymer with excellent media resistance, a high level of mechanical strength, and maximum purity without additives or stabilisers. ECTFE consists of an alternating arrangement of ethylene and chlorotrifluoroethylene. This makes it the ideal material for applications involving high temperatures and extremely aggressive media. These plastics can be used between -30 °C and +140 °C. Aggressive media such as nitric acid, sulphuric acid, free chlorine and ozone can be transported safely. The excellent surface quality and abrasion resistance make them ideal materials for use in the petrochemicals industry, life sciences and the food industry.



Double containment piping systems and COOLSAFE

The reliable Poly-Flo double containment piping system made of PP or PE is extruded in a single production step. Thanks to its compact design with a small annular gap and low weight, the system can be quickly and reliably installed using simultaneous welding, even in cramped conditions. The insulated COOLSAFE PE piping system keeps media at temperatures as low as -30 °C. The annular gap between the outer pipe and the media pipe is filled with polyurethane foam for optimal thermal insulation.



Abrasion-resistant systems

The three-layer MINELINE piping system was developed to transport abrasive media. Economic operation due to a longer service life, minimal thermal expansion thanks to the white surface, and high operating reliability due to the thicker walls are the system's most important properties. Thanks to the abrasion-resistant layer in the pipes and fittings, all the pipework is protected against fast abrasion.

PP is ideal for pickling plants, the chemicals industry and also for extremely aggressive sewage, because chemicals at high temperatures are used in these areas.

PP-H/PP-R - industrial piping systems for high temperatures and chemicals



Special applications

PP plays an important role in reverse osmosis, which is used in desalination plants. Permanent freedom from corrosion and resistance to salts and minerals, as well as smooth inner surfaces, ensure decades of maintenance-free operation. As high operating pressures are typical in plants of this type, PP – with its high creep strength – is the most popular material.



Custom parts - tailor-made solutions

AGRU has been known for its unrivalled expertise in custom part manufacturing for decades. Segmented fittings made of PP were used in this project for an industrial ventilation system. PP impresses with its high temperature and chemical resistance here as well.

Product range

AGRU PP-H/PP-R - industrial piping systems

Pipes
PP-H OD 20mm – 1400mm
PP-R OD 20mm – 800mm



MULTI fittings
SDRs of 17 and 11
OD 20mm – 315mm



Extended fittings
SDRs of 17 and 11
OD 63/50mm – 315/250mm



Short-spigot fittings
SDRs of 17 and 11
OD 25/20mm – 315/280mm



Segmented fittings
SDRs of 17, 26, 33 and 41
OD 560mm – 1200mm



Socket welding fittings
SDR of 7.4
OD 20mm – 110mm



Electrofusion welding fittings
OD 20mm – 355mm



Valves
OD 20mm – 140mm





Fluoroplastic systems Safe transport of highly aggressive media



ECTFE - the premium class

Ethylene chlorotrifluoroethylene (ECTFE) is a thermoplastic copolymer with an alternating arrangement of ethylene and chlorotrifluoroethylene. For applications involving temperatures between $-30\text{ }^{\circ}\text{C}$ and $+140\text{ }^{\circ}\text{C}$ or aggressive chemicals (e.g. free chlorine in the medium and 98% sulphuric acid), ECTFE is the ideal solution. The ECTFE piping system is the ready-to-use, highly resistant piping system made by AGRU. For even tougher requirements, AGRU also supplies liner pipes made of FEP and PFA, which possess the highest chemical resistance.



PVDF - highest product purity

Polyvinylidene fluoride (PVDF) is an ultra-high purity homopolymer without additives. This makes it physiologically safe and suitable for use in ultra-high purity applications. It also offers high mechanical strength and excellent chemical resistance. Just like ECTFE, PVDF is easy to handle and use. It can be used between $-20\text{ }^{\circ}\text{C}$ and $+120\text{ }^{\circ}\text{C}$.

Product range AGRU ECTFE/PVDF

Pipes
ECTFE OD 20mm – 200mm
PVDF OD 16mm – 400mm



MULTI fittings
ECTFE OD 20mm – 110mm
PVDF OD 20mm – 225mm



Fittings
ECTFE OD 63mm – 110mm
PVDF OD 16mm – 315mm



Fittings for socket welding fittings
ECTFE
PVDF



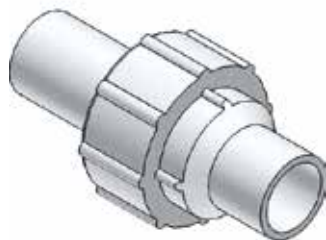
Valves
ECTFE OD 20mm – 63mm
PVDF OD 20mm – 140mm



HPF coupler
PVDF OD 20mm – 63mm



Union
ECTFE OD 20mm – 63mm
PVDF OD 20mm – 90mm



Backing ring
OD 20mm – 630mm





Double containment piping systems and COOLSAFE double safety and piping system for cooling water



AGRU double containment piping systems

Poly-Flo includes a piping system made of PE 100-RC or PP-R for the safe transport of hazardous media. It is easy to install using simultaneous or cascade welding, and both the media pipe and the protective pipe offer full pressure resistance.

The double containment piping system is prefabricated as standard and can be connected using simultaneous butt welding, after spacers have been welded in, or using cascade welding.



COOLSAFE

The AGRU COOLSAFE system is the best solution for the energy-saving transport of cold media. The AGRU COOLSAFE product line is a double containment piping system made of premium PE 100 plastic. The annular gap between the outer and the media pipe is filled with polyurethane foam for optimal thermal insulation. This makes COOLSAFE the perfect piping system for cold media such as those as used in air conditioning systems. It can also be used for transporting hot water as a customised variant with a PP media pipe.

Product range

AGRU double containment piping systems and COOLSAFE

Poly-Flo pipe
PP-R + PE 100-RC
SDR 17/11
Dim. 50/32, 90/63, 160/110



Poly-Flo fittings
PP-R + PE 100-RC
SDR 17/11
Dim. 50/32, 90/63, 160/110



Poly-Flo fittings
PP-R + PE 100-RC
segmented
SDR 17/11
Dim. 50/32, 90/63, 160/110



Poly-Flo measuring fitting
PP-R + PE 100-RC
turned
SDR 17/11
Dim. 50/32, 90/63, 160/110



Double containment fitting
PP/PP, PE/PE
Simultaneous welding
from dim. 90/32 to 355/250



Double containment pipe fitting
PE/PVDF, PP/PVDF
Cascade + e-socket welding
from dim. 90/32 to 280/160



COOLSAFE pipe
from dim. 90/32 to 355/250
as standard
(customised dimensions
on request)

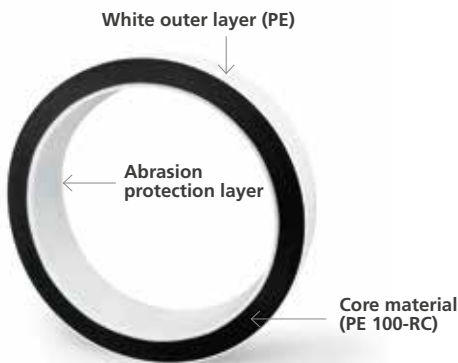


COOLSAFE fittings
Tee, bend, reducer, anchor
point, measuring adapter
and thread adapter
from dim. 90/32 to 355/25
(customised dimensions
on request)





MINELINE I and II Abrasion-resistant piping systems



MINELINE II, the three-layer system

MINELINE II pipework has a longer service life due to the abrasion-resistant inner layer in the pipes and fittings. The outer layer is white and reflects sunlight, which keeps thermal expansion to a minimum.

The core layer made of PE 100 (-RC) and the substantially greater wall thickness of the innovative three-layer structure guarantee high operating reliability.

MINELINE I has a white outer layer, but does not have an additional inner layer. The bright surface keeps thermal expansion to a minimum.

Guaranteed safety

In addition to the safe three-layer structure, MINELINE II can be connected using a combination of butt and electro-socket welding. This helps to avoid potential weak points and protects the inner pipe against abrasion.



Heated element butt welding

E-socket welding

Combined welding

Product range

AGRU MINELINE I and MINELINE II

MINELINE
Pipe



MINELINE
Tee



MINELINE
Segmented bends



MINELINE
Stub flange



MINELINE
Sweep bends





Electrically conductive customised materials Safe transport of substances with a risk of explosion



Occupational safety is key

An electrostatic charge in the pipework must be prevented when flammable media is being poured in, emptied, stirred, mixed or sprayed. If the pipework is routed through an potentially explosive atmosphere, a single spark discharge can cause an explosion. ESD (electrostatic discharge sensitive) plastics offer additional safety by permanently dissipating electrostatic charges in a controlled manner. They are therefore used in areas where sparks from electrostatic charges need to be prevented due to explosion protection requirements, and are used for piping systems in areas with a potentially explosive atmosphere.



Easy installation

Both PPS-ESD el and HDPE-ESD el can be butt, socket or heating wire welded. In heated element butt welding, the pipe is able to conduct electricity beyond the joint layer without additional work. The electro-socket welding of electrically conductive pipes using electro-socket fittings made of non-conductive PE is only permissible with electro-socket fittings equipped with embedded heating wires, as low current flows can occur otherwise.

Product range

AGRU PPS-ESD el / HDPE-ESD el

Pipes
PPS-ESD el
OD 32mm – 400mm
HDPE-ESD el
OD 32mm – 400mm



90° bend
PPS – ESD el
OD 32mm – 315mm
HDPE-ESD el
OD 125mm – 315mm



Tee
PPS-ESD el
OD 32mm – 315mm
HDPE-ESD el
OD 32mm – 315mm



Reducer concentric
PPS-ESD el
OD 63/16mm –
315/225mm
HDPE-ESD el
OD 63/16mm –
315/225mm



Stub flange
PPS-ESD el
OD 32mm – 400mm
HDPE-ESD el
OD 32mm – 400mm



Backing ring
PPS-ESD el
OD 32mm – 315mm
HDPE-ESD el
OD 125mm – 315mm





References

The AGRU range of industrial piping systems includes electro-socket fittings, socket welding fittings and butt welding fittings for any application.



AGRU 90° MULTI bends are available in a variety of materials and complete the AGRU industrial piping system range.

Pipes made of PE offer a variety of industrial application options. Thanks to their high resistance to UV light, they can also be installed outdoors as well as indoors.





The AGRU Poly-Flo double containment piping system can be joined using time-saving simultaneous welding.



Pipework made of electrically conductive PE is required in many industrial applications.



PP is also very suitable for reverse osmosis in seawater desalination.



The Plastics Experts.

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