



The Plastics Experts.

# Bridge Design & Construction

WITH ENGINEERING  
PLASTICS COMPONENTS





## The Plastics Experts.

For bridge building, AGRU disposes solutions for structural corrosion protection and for the media transport over the bridge. Both are among the best in economical and technological terms. AGRUSAFE concrete protective liners will protect any bridge construction against moisture penetration. This considerably extends the life of the bridge structure. AGRULINE involves an ingenious piping system comprised of especially robust PE 100 and PE 100-RC materials for use in gas and water supply as well as corrosion protection of stay cables. The broad range of available thermoplastics, the product expertise of our application engineers, our high-quality production, and not least our global logistics network make AGRU your best partner for every bridgework.

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, protective liners for concrete 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.



ISO 9001 Certificate



ISO 14001 Certificate

### 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 wastewater infrastructures.

# Bridge Design & Construction

## AGRU's one stop shop

Bridges are made of reinforced concrete and / or steel. Both materials are susceptible to corrosion, especially if located near the shore. AGRUSAFE concrete protective liners made of chemically resistant plastics prevent concrete corrosion effectively and therefore extend the life of bridge structures. Bridges do not only carry traffic, they also bypass gas & water supply lines. The AGRULINE product group offers a complete polyethylene piping system for safe and environmentally friendly supply of gas, potable water and wastewater disposal. To prevent corrosion of the stay cables, AGRULINE also encompasses bridge pipes with or without spiral beads on the outside.

### Corrosion protection

#### Maintaining structural strength and stability

Plastic pipes & concrete protective liners from AGRU

- prevent corrosion of foundations, piles, framework
- protect the stay-cables from rusting
- are resistant against chemicals and sea water

### Safe media transport

#### HDPE pipes offer high fatigue strength

Non-corrosive, abrasion and high impact resistant AGRU piping systems

- are ideal for water & gas supply lines crossing over bridges
- can be used for surface water drainage
- are the best choice for de-icing sprinkler systems

### Long-term reliability

#### Thermoplastic products are durable

High-quality engineering polymers

- offer a long service life
- are resistant to cracks and seismic loads
- cope with environmental impacts such as heat, cold, UV radiation, earthquakes

### Easy installation

#### Thermoplastics are flexible

AGRU's well designed products

- are lightweight and easy to handle
- offer good weldability
- comprise fittings for fast and easy installation

### Environmental friendliness

#### Plasticizer-free materials

PE and PP meet potable water requirements and are

- physiologically harmless
- halogen-free
- environment-friendly and ground water neutral





## Corrosion protection of stay cables



### Cable lining with spiral pipes

Stay-cables suspend the bridge deck from the towers and are therefore the important structural feature of the bridge construction. An effective corrosion prevention method that lasts for many years are our bridge pipes made of HDPE with spiral beads on the outside of the pipes to conduct stormwater down to the bridges drainage system. They can resist the most severe environmental conditions and offer seamless corrosion protection due the hermetic encapsulation of the cables. The spiral pipes are available in different colors such as white, black, red or co-extruded.



### Cable lining with smooth pipes

If for some architectural issues a smooth surface of the protective pipe is required, AGRU offers a wide range of light-weight HDPE pipes for effective, economic and long lasting corrosion protection and a high fatigue strength. HDPE is resistant against corrosion, UV-rays, high and low temperatures (+60 °C / -40 °C) and most important: it is flexible. Its impact resistance is so high, that it can even sustain earth-quakes.

## Stormwater drain from stay cables

If stormwater, melt water or condensation water drops down continuously on one point over the years, the bridge structure can be damaged. Furthermore in cold areas, dripping water can freeze and form dangerous icicles on the bridge cables. In order to prevent these phenomena, spiral pipes from AGRU are the right choice. The water is being evacuated along the spiral, that runs all along the outside of the pipe. Another advantage of the spiral pipe is that it reduces the area of wind attack, thus saving the bridge construction from swinging.



### FITTINGS SUCH AS STUB FLANGS, REDUCERS ARE AVAILABLE



## The AGRU spiral bridge pipe

Cable-stayed bridges have become popular due to advancements in prestressed concrete structures technology and economic advantages over other types of structures. With the increasing popularity of these bridge types, of equal importance is the effect of corrosion protection systems of the stay cables and anchorages. Corrosion if not properly monitored and most importantly prevented, may lead to progressive structural failure. An effective corrosion prevention method that lasts for many years are our HDPE pipes with spiral beads on the outside of the pipes to conduct stormwater down to the bridges drainage system. The spiral pipes are available in different colors, with solid-coloured pipe wall and co-extruded.



### PROTECTIVE PIPE FOR BRIDGE CABLE STAYS

Dimension	Code	Detail	OD [mm]	s [mm]	s [-tol]	s [+tol]	Weight/m
125	1B.799.0125.33	125X3,9 SDR33 ISO S-16	125	3.9	0	0.5	1.56
140	1B.799.0140.33	140X4,3 SDR33 ISO S-16	140	4.3	0	0.6	1.93
160	1B.799.0160.33	160X4,9 SDR33 ISO S-16	160	4.9	0	0.6	2.48
180	1B.799.0180.33	180X5,5 SDR33 ISO S-16	180	5.5	0	0.7	3.13
200	1B.799.0200.33	200X6,2 SDR33 ISO S-16	200	6.2	0	0.8	3.88
225	1B.799.0225.33	225X6,9 SDR33 ISO S-16	225	6.9	0	0.8	4.85



## Media transport via bridges



### Surface water drainage system

Stormwater management is important to grant safe driving conditions on the bridge lanes. If the drainage system is not working correctly, street flooding may occur. To prevent this, the investment in a reliable piping system is vital. AGRULINE piping systems are made of crack resistant PE 100-RC and are your best bet for stormwater and sewage water disposal.



### Sprinkler systems for de-icing

Bridges are especially vulnerable to fast-freezing in winter-time. To maintain the driving lanes free from ice, a de-icing system is often installed. Besides reducing the danger and delays caused by icy pavement, such a system should reduce corrosion (on the bridge and on the cars that use it) if it is operated with a salt-free de-icer. Again AGRULINE pipes are the best option for de-icing sprinkler systems.



## Sureline I pipes - the reliable classic

- PE 100 (-RC) pipes for potable water, gas and wastewater
- pipes are black or with coloured stripes running axially for clear identification of the application area
- flexible and light, ensuring broad range of applications
- strong resistance to point loads and slow crack growth for top safety during installation and operations
- no sand embedding required, translating into high potential savings through reducing construction costs
- suitable for alternative trenchless laying methods, such as milling, ploughing, relining, pipe bursting, sublining, swage-lining, horizontal directional drilling and soil displacement hammer



### PRODUCT RANGE

#### Dimensions

SDR 17	OD 63 mm - 1000 mm
SDR 11	OD 20 mm - 800 mm



## Bridge pipes for water & gas supply

When potable water, gas or sewage has to be transported safely via the bridge from one bank to the other, AGRULINE is the system to choose. It offers a wide selection of pipes, fittings, valves and special components. AGRULINE is a maintenance free pipework with welded joints and high-grade PE 100-RC materials for high operational reliability.

## Sureline II pipes - for top safety

- PE 100-RC pipes for potable water, gas and wastewater
- clear labelling of application through coloured signal layer
- flexible and light, ensuring broad range of applications
- strong resistance to point loads and slow crack growth for top safety during installation and operations
- no sand embedding required, translating into high potential savings through reducing construction costs
- suitable for alternative trenchless laying methods, such as milling, ploughing, relining, pipe bursting, sublining, swage-lining, horizontal directional drilling and soil displacement hammer



### PRODUCT RANGE

#### Dimensions for water, wastewater

SDR 17 / SDR 11	OD 75 mm - 1200 mm
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#### Dimensions for gas

SDR 17 / SDR 11	OD 75 mm - 400 mm
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## Sureline III pipes with protective layer - twice the safety

- PE 100-RC inner pipe with additional protective layer of PP
- twice the safety for extreme applications such as pipe bursting and horizontal directional drilling
- horizontal directional drilling on stony soils
- scratch-proof PP protective layer prevents significant damage to inner lining during installation and improves operational reliability
- rapid heated tool butt welding thanks to factory-stripped ends



### PRODUCT RANGE

#### Dimensions for gas: orange protective layer

SDR 17 / SDR 11	OD 63 mm - 225 mm*
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#### Dimensions for potable water: blue protective layer

SDR 17 / SDR 11	OD 63 mm - 1200 mm
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#### Dimensions for wastewater: brown protective layer

SDR 17 / SDR 11	OD 63 mm - 1200 mm
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## Corrosion protection of concrete



### Lining of cast in situ structures

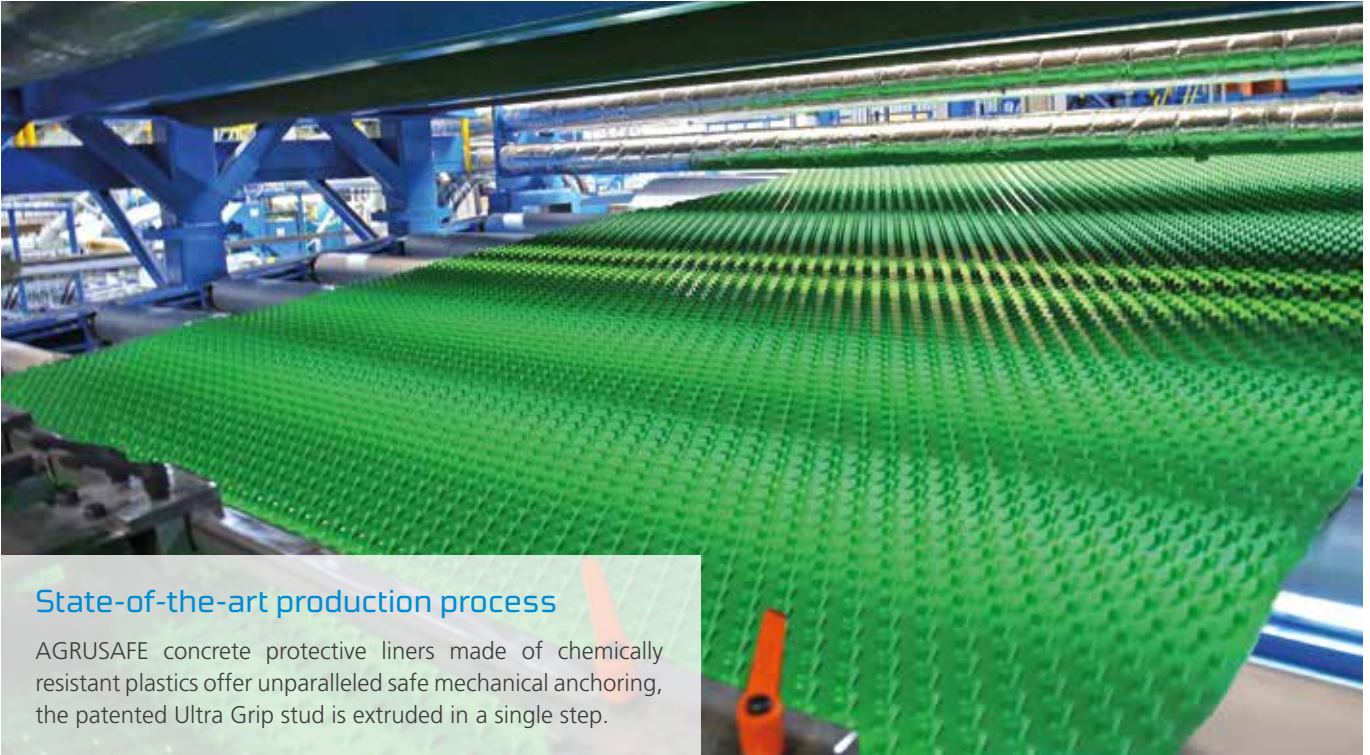
The concrete protective liners are adjusted to the shape of the construction on-site. They are mounted to the formwork fast and safely by means of end profiles and tear off profiles. After the hardening of the concrete the concrete protective liner system is made leak-tight with extrusion welding. This installation method has the benefit of erecting the concrete protective liners and the formwork at the same time. Therefore no additional time is required.



### The ultimate grip in concrete

AGRUSAFE Ultra Grip concrete protective liners feature a special stud design, which ensures rock-solid anchoring in the concrete. On the one hand studs and liners are extruded in a single piece. Other hand, the stud link is located near the upper end of the stud, so that the pull-out strength is additionally increased. Since liners and studs are designed for groundwater pressures of up to 1.75 bar at 20 °C, even structures in the water remain permanently dry.





### State-of-the-art production process

AGRUSAFE concrete protective liners made of chemically resistant plastics offer unparalleled safe mechanical anchoring, the patented Ultra Grip stud is extruded in a single step.

### Product range

#### ULTRA GRIP PRODUCT RANGE

Material	thicknesses
PE black/white	2.0 mm – 4.0 mm
PE yellow	2.0 mm – 4.0 mm
PE black	2.0 mm – 4.0 mm

Special colours are available on request.







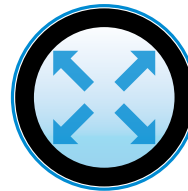
## Environmentally friendly

### Halogen free materials

Plasticisers are additives that increase the plasticity or decrease the viscosity of plastics. Substantial concerns have been expressed over the safety of some plasticizers such as halogen. PE and PP are free from halogen, meet potable water requirements and are physiologically harmless and ground water neutral. This makes pipes made of these material the first choice for applications.

### Contamination protection

Water and environmentally hazardous media must be transported safely. AGRU HDPE pipes protect the environment from hazardous media inside the pipeline (e.g. sewage, oil, chemicals, gases). The diffusion of these media through the pipe wall and the contamination by pipe breaks is effectively prevented with AGRULINE pipes.

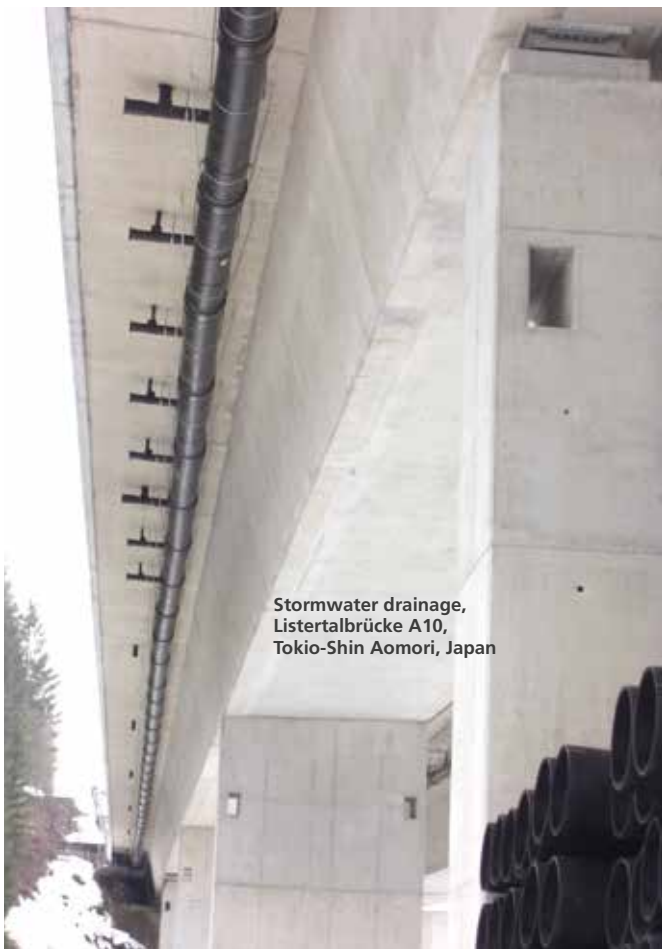




# References



Bridge foundation protection with Sure Grip liner, Dubai, VAE



Stormwater drainage, Listertalbrücke A10, Tokio-Shin Aomori, Japan



PE pipes for protection of bridge stay cables

Kao Ping HIS Bridge, Kaohsiung, Taiwan





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Your distributor

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