



LARGE DIAMETER PIPING SYSTEM

UP TO Ø2250 MM



agru

Worldwide Competence
in Plastics





Worldwide competence in plastics

AGRU Kunststofftechnik GmbH is a family-owned enterprise headquartered in Austria with worldwide activities in production and sales of high-quality thermoplastic polymer products. One of our core competences are piping systems made of polyethylene (PE).

The product group AGRULINE offers a complete and high quality range of pipes, fittings, valves and special parts made of PE. The main applications are the safe supply of natural gas and potable water as well as the transport of sewage.

Due to the increasing demand for pipes with larger diameters we expanded our PE pipe product range. AGRU's 50 years of experience in tool construction and pipe extrusion allows us to design an extrusion line for diameters up to 2250 mm and a pipe wall thickness of up to 145 mm. The extrusion line is mobile and can be set up directly on-site to reduce transportation costs.

LARGE DIAMETER PIPING SYSTEM



Unique system

Especially in the field of large diameter pipes ease of installation and cost efficiency are important factors. Long lifetime as well as the suitability of HDPE for the transport of many media are excellent features for piping systems and pipelines.

PE piping systems are proven in smaller dimensions ≤ 1400 mm for more than 50 years and various studies have clearly shown that HDPE systems are suitable for a life time of >100 years.

Another benefit compared to other materials is the corrosion resistance. Costly and maintenance intensive corrosion protection measures are not required for piping systems in PE 100.

Applications

Large diameter PE 100 piping systems are applied onshore and offshore for:

- Pipelines to transport potable, salt and process water
- Sewage systems for industrial and municipal wastewater
- Mining pipes to transport slurries and water
- Intake and outfall pipes
(e.g. for seawater desalination and power plants)
- Underground fire fighting pipelines
- Cooling water pipes
- Pressure pipes in power plants
- Pipelines for irrigation
- Tank construction



A UNIQUE AND DURABLE SOLUTION



Complete solution

AGRU offers a complete range of large diameter pipes, fittings and suitable joining techniques to construct pipelines and piping systems. The standard and customised fittings are designed according to state-of-the-art standards and fulfil the necessary performance requirements. AGRU's experience in fitting production as well as welding technology is a key advantage to provide the highest quality solutions for the construction of large diameter pipelines.

AGRU's mobile setup ability gives us the capability to produce all components on-site. This is a milestone for the fast, cost effective and environmentally friendly construction of large pipelines.





Polyethylene piping system benefits

Flexibility

Due to the flexibility the pipes can be bent easily, which saves costly fittings and eases the installation. With its natural resiliency the PE 100 pipe absorbs surge pressures, vibrations and stresses caused by soil movement such as earthquakes.

High impact strength

The high impact strength ensures a great resistance to effects caused by external damage.

Easy handling

Low weight PE 100 pipes supplied in long length increase efficiency on job-sites because of less frequent jointing, easier handling and pipe laying. Low space requirement on-site for installation is a further important benefit of HDPE piping.

Earthquake pipe failure statistic:

Material	length [km]	failures /km
PVC (water)	99.95	0.80
Asbestos cement (water)	221.90	0.95
Galvanised steel (water)	3.81	0.52
Cast iron (water)	1.03	0.97
Polyethylene (gas)	115.13	0.00

Sources: EAP Colombia, March 1999 and Gases del Quindío E.S.P Colombia, 1999

HIGH QUALITY PRODUCTS

Weldability

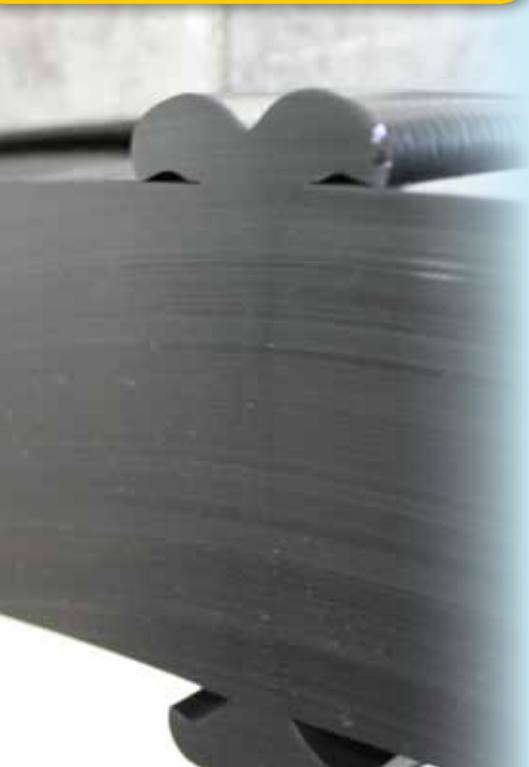
The pipes and fittings are connected by heating element butt welding, which provides durability and leak-proof installation. Excellent hydraulic performance, no risk of in- and exfiltration are key factors for today's modern piping systems which are ensured by HDPE large diameter pipelines.

Abrasion, chemical and weather resistance

PE 100 comes with excellent corrosion and abrasion resistance which make it an ideal material for pipelines. The outstanding durability to a wide range of chemicals allows the use of polyethylene systems in industrial and chemical applications. Due to their carbon black content PE pipes are UV resistant, which also allows installations exposed to direct sunlight.

Long Life

The PE piping systems are maintenance free and the life expectancy is >100 years.



Mobility / logistics

Since the very beginning the new developed extrusion line for large diameter PE pipes was also designed for a mobile setup with optimised site assembly and transportation requirements.

- The mobile extrusion plant for large diameter pipes can be shipped to the site in containers and can be set up fast.
- All necessary accessory equipment (such as welding equipment) can be shipped to the site, to build a complete pipeline.
- Highest product quality for on-site production is guaranteed by:
 - Inline ultrasonic wall thickness measurement
 - Mobile testing laboratory to verify raw material and pipe quality
- AGRU provides trainings for the operation of the production plant as well as the welding and installation of PE pipeline.



EVERYWHERE ON EARTH



The mobile production line can be shipped to construction sites almost anywhere in the world.

This offers further benefits to the client:

- Reduced installation costs
- Significant reduced transportation costs
- Significant reduced CO₂ emission and environmentally friendly construction
- No risk of damaging the pipe during transport





Construction of pipelines

Offshore installations

The large diameter PE pipes can be produced directly onto the water. Then they are sealed and prepared for towing to their final position. The pipes can be extruded up to 500 m length, which increases efficiency because of fewer welding and faster installation.

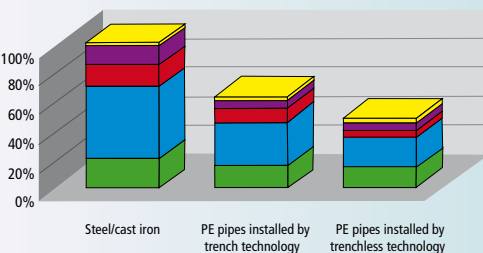
Onshore installations

The large diameter PE pipes are produced in the maximum length which can be handled at site. The welding can be done outside the trench in order to minimize the size of the trenches.

Relining

Large diameter PE pipes are excellent suitable for rehabilitation of damaged pipelines by various methods such as: roll down relining, swage-lining, close-fit-lining (sublining) and slip lining. This method enables fast and durable repair of existing piping systems in urban as well as industrial areas.

Comparison of construction costs



■ Pipe/fitting ■ Trench preparation
■ Backfill/finish ■ Pipe laying
■ Miscellaneous

Based on OD 400 mm.

UNIVERSALLY APPLICABLE

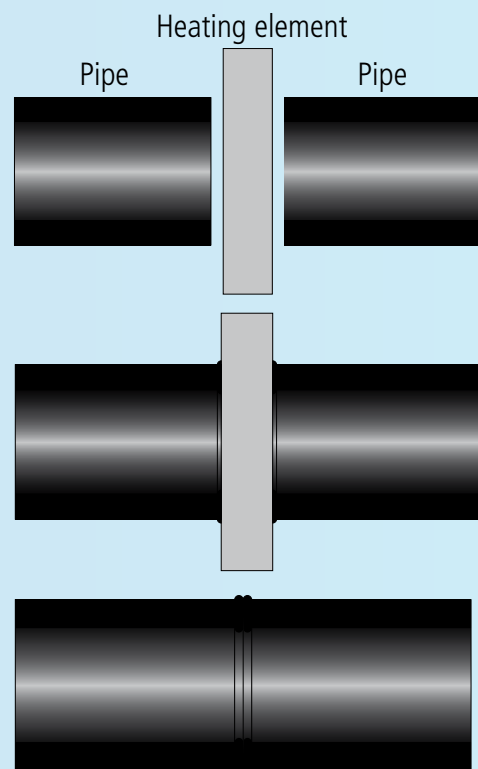
Joining technology

AGRU provides field welding machines for butt welding of pipe sections and workshop welding machines to manufacture segmented large diameter fittings on-site. The butt fusion technology is proven for many years in the field and does offer many advantages.




- 100 % leak-proof joint
- Welded joints are as strong as the pipe itself
- Longitudinally force locked joint
- High mechanical strength

Heating element butt welding (acc. to DVS 2207 part 5):

The two pipe components are clamped in the welding machine and the pipe ends are planned. The welding area is heated up with the heating element and then joined together with a defined welding pressure. This process ensures high-quality joints with excellent reproducibility also under site conditions.



Supply range - PE 100 pipes

	Pipe OD [mm]							
	20-900	1000	1200	1400	1600	1800	2000	2250
Pipe length according to site requirements								
SDR 41-17								
SDR 13.6								
SDR 11								

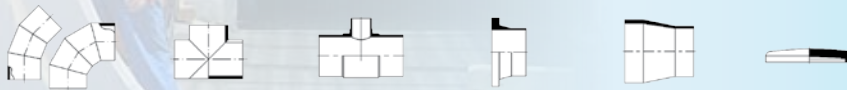
COMPLETE PRODUCT RANGE

SDR **Maximum component operating pressure [bar]**

41	4.0
33	5.0
26	6.3
17	10.0
13.6	12.7
11	16.0

Valid for 20 °C and 50 years lifetime;
Safety factor c = 1.25; Medium: water.

Supply range - PE 100 fittings



SDR 41-11	800	800	800/≤700	800	800/630 800/710	800
	900	900	900/≤800	900	900/710 900/800	900
	1000	1000	1000/≤900	1000	1000/900	1000
	1200	1200	1200/≤1000	1200	1200/1000	
	1400	1400	1400/≤1200	1400	1400/1200	
	1600	1600	1600/≤1400	1600	1600/1400	
SDR 41-13.6	1800	1800	1800/≤1600	1800	1800/1600	
SDR 41-17	2000	2000	2000/≤1800	2000	2000/1800	
	2250	2250	2250/≤2000	2250	2250/2000	
BEND 30°, 45°, 90°						
	TEE		TEE REDUCED	STUB FLANGE	REDUCER	END CAP

Dimensions in mm.

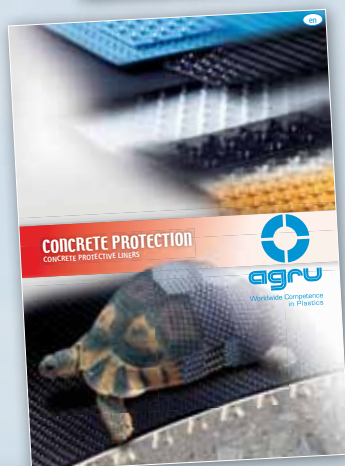




AGRULINE

Unique and innovative solutions in polyethylene for natural gas, potable water, sewage and industrial piping systems

- Easy & fast
- Safe & tough
- Pressure resistant
- High durability



CONCRETE PROTECTION

Concrete protective liners

- High flexibility
- Excellent abrasion resistance
- Good chemical resistance



AGRULINE

PIPING SYSTEMS FOR NATURAL GAS, WATER & SEWAGE



CONCRETE PROTECTION

CONCRETE PROTECTIVE LINERS

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