

KPPS

Krah Pressure Pipe System
ISO/AWI 29561-1
(PE-GFR)





PRESSURE APPLICATIONS

Krah PE GFR PIPES

The tough new breed in town

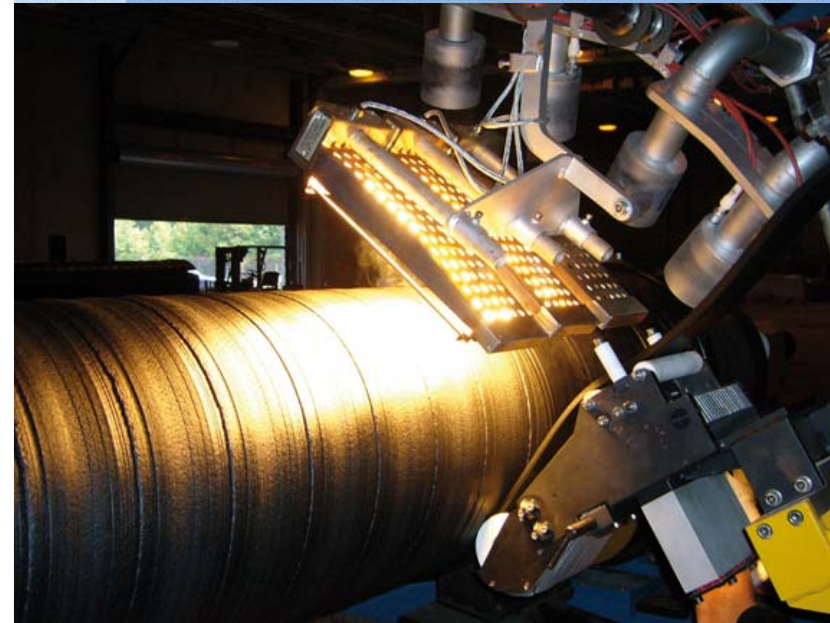
PRODUCT: GLASS FIBRE REINFORCED POLYETHYLENE
PRESSURE PIPES FROM Krah AG

APPLICATION: RETICULATION OF

- POTABLE WATER,
- CHILLED WATER,
- WASTE WATER
- AND ALL OTHER FLUIDS

TESTING:

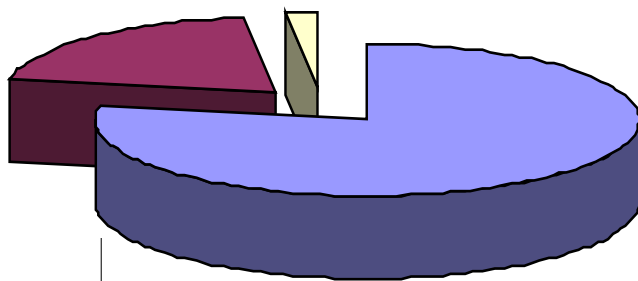
- ASTM TESTING,
- ISO STANDARDISATION,
- THIRD PARTY – BECETEL, BELGIUM





■ Material Compound

To improve the properties of the material we have created a new compound consisting of polyethylene, chopped fibre and a bonding agent



- PE 78%
- Fibre 20%
- Bonding agent 2%





Material

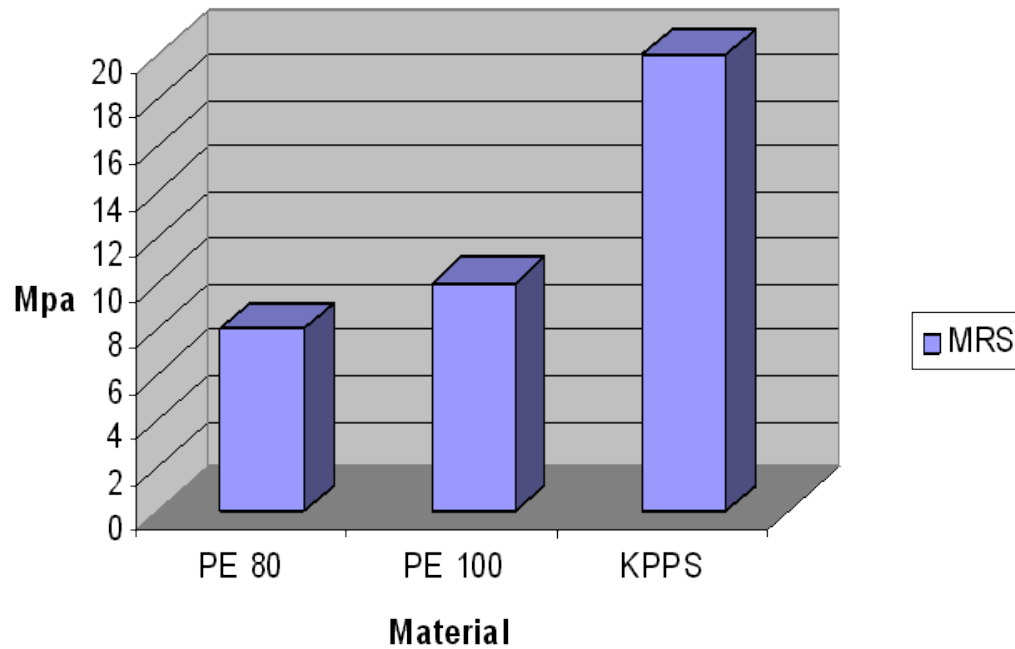
Properties and tests

Description	Test method	Test period	Value	Unit
Density	EN ISO 1183		1.06	g/cm ³
Bending E-modulus	DIN 53457	1 min	2515	N/mm ²
	DIN 54852	24h	1804	N/mm ²
Linear thermal expansion coefficient	DIN 53752		5 x 10 ⁻⁵	K-1
Determination of the oxidation introduction time (OIT)	EN 728		> 55	min
Tensile characteristics stress at yield (mean value)	ISO 527-4		38.6	N/mm ²
Tensile strength			38.6	N/mm ²
Strain at break			5.4	%
Tensile E-modulus	ISO 527-4		2355	N/mm ²
Flexural E-modulus	NBNEN ISO 178		2566	MPa
Progression curves	ISO 9080		> 20	Mpa

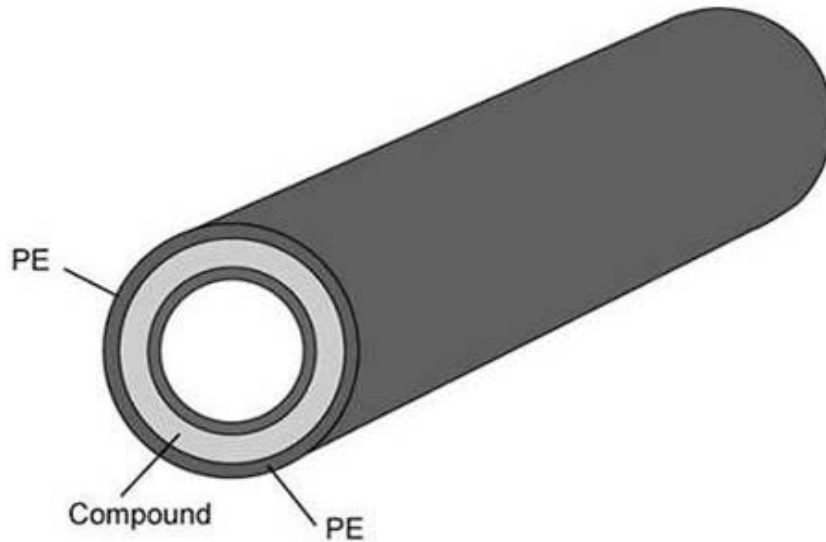


Material Classification

ISO 9080 analysis proves that the minimum required strength (MRS-value) of the KPPS-pipe material (PE-GR 200) at 20°C/50 years is **23 MPa**.



■ Pipe Design



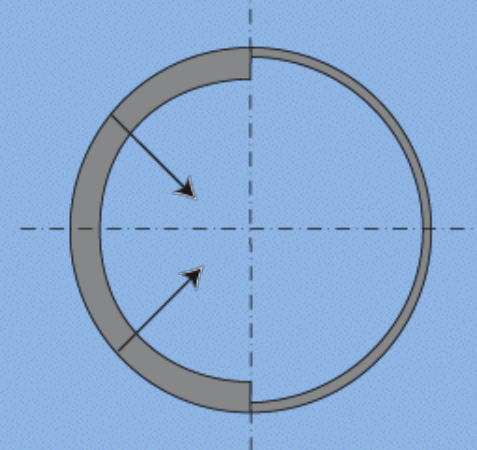
The pipe wall consists of **three layers** but in only **one** extrusion process.

Inner / outer wall: 100% polyethylene
Middle layer: out of the compound

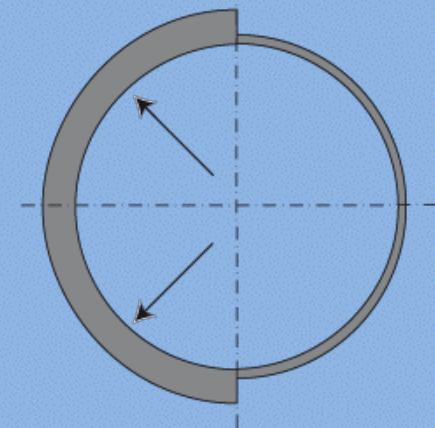


■ Pipe Nominal Diameter

- Due to our production technology the pipe is calibrated on the inside diameter according to (DIN 8074)
- Our nominal diameter is always the inside diameter and also the hydraulic diameter
- Every increase of stiffness or pressure rate will lead to an increase of the wall thickness and the outer diameter



DIN 8074

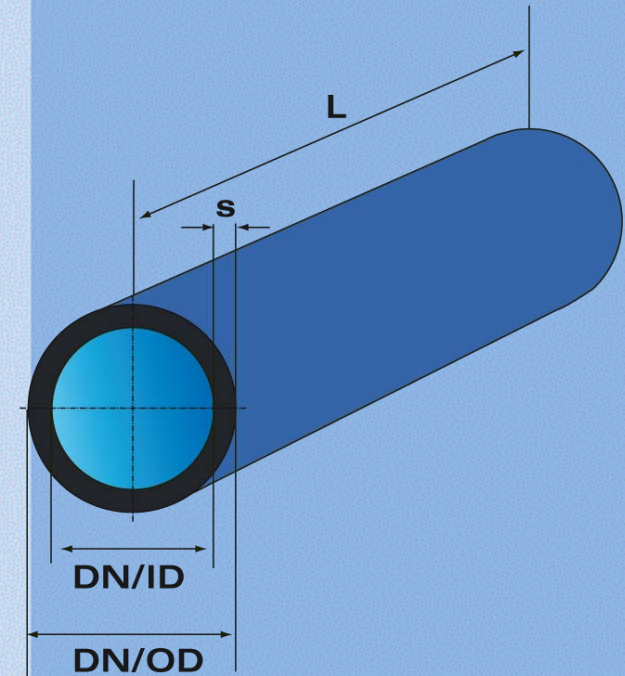
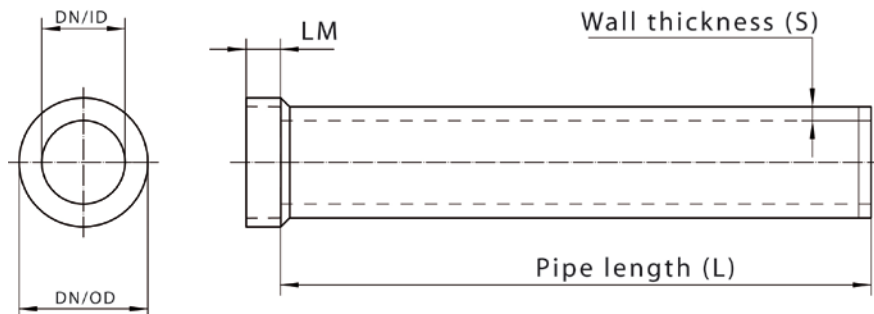


KPPS



■ Pipe Length

- Diameter ranging from 500 mm up to 4000 mm
- The laying length is between 1 m and 6 m
- Integrated socket and spigot
- With complete set of fittings
- With solid wall





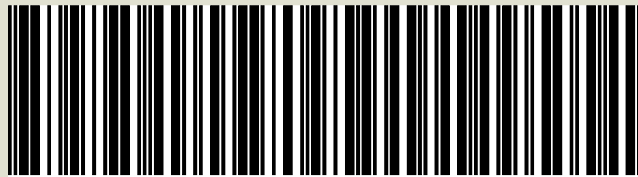
■ Joints

Homogeneous jointing

Electro- Fusion

- Integrated part in the pipe
- Integrated in all fittings
- Electro fusion device used to trace back the specific product
- 100% tight

Krah KPPS PE – GR DN 2000



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■ Joints

Homogeneous jointing

Butt – Fusion

- Ends of the pipes and fittings are butt-welded
- Recommended for maximum wall thickness of 150 mm
- Diameter from 500 mm up to 2500 mm





■ Joints

Mechanical jointing

Flange Connection

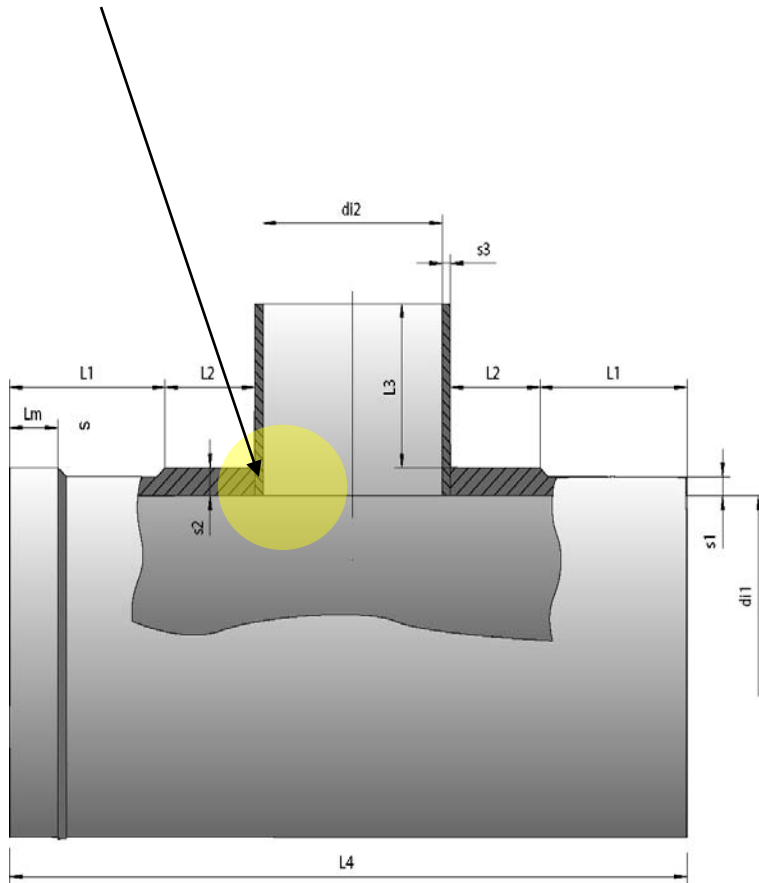
- The stub end and the flange are directly integrated in the pipe
- Available as separate fitting
- Used for open sea discharge applications
- Facility of disjoining





Fittings Branches

E-Fusion



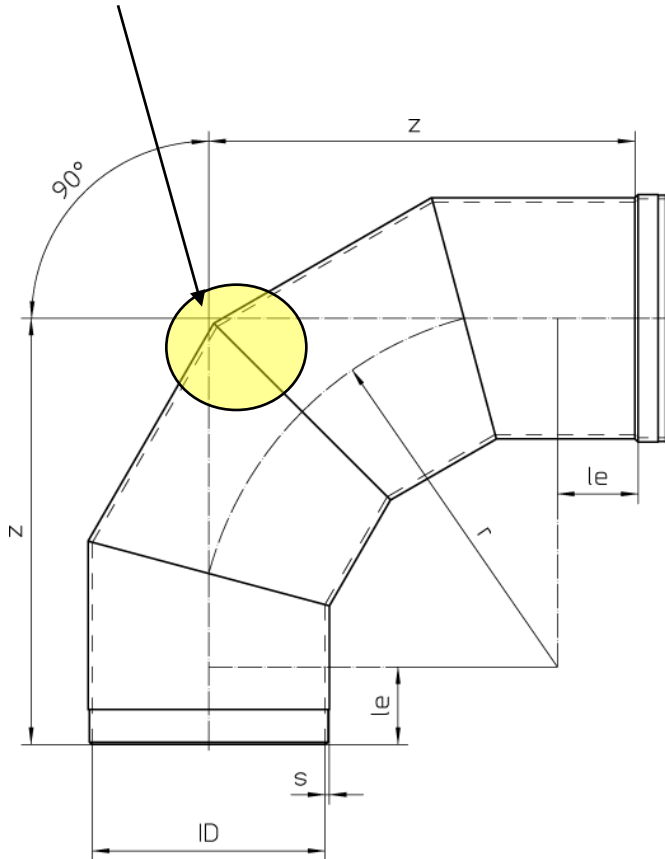
Can be fabricated and designed according to the application's requirements



Fittings

Bends

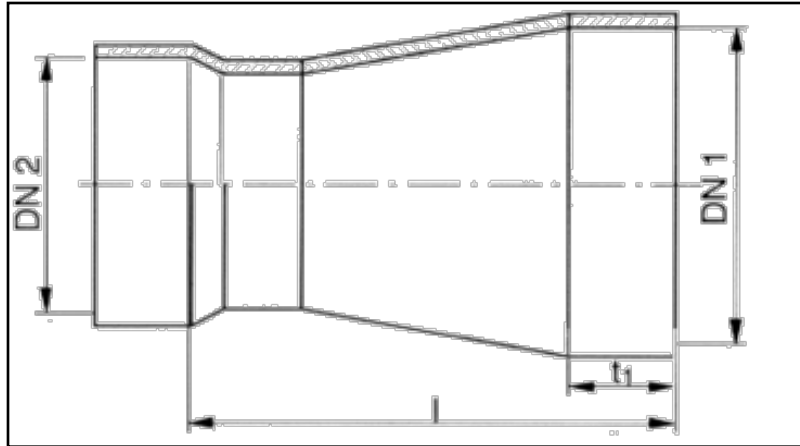
Butt welding



Bends can be fabricated according to the application's requirements from 15° up to 90°



■ Fittings Reductions



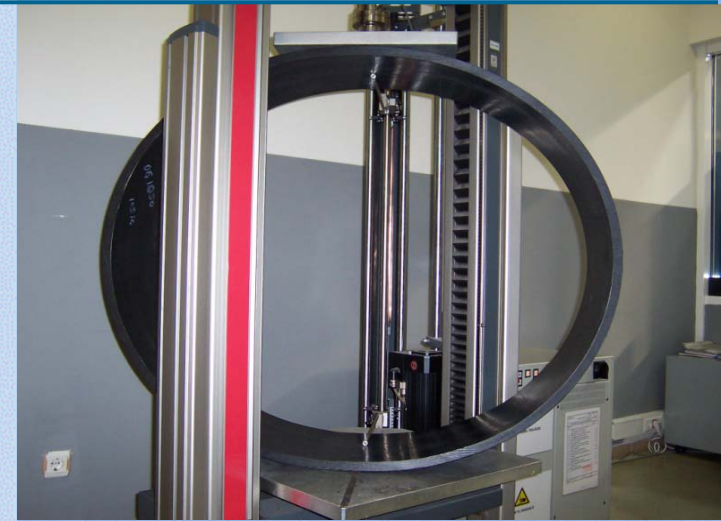
We can produce any type of reduction according to the customers requirements



■ Pipe System Tests

Tests done on our pipes

- Short – term burst pressure according to ASTM D1599
- Slow crack growth according to EN ISO 13479
- Rapid crack propagation S4 according to EN ISO 13477
- Decohesion of an electro fusion joint according to EN 1555 and EN 12201
- Deflection test according to EN1440
- Pipe stiffness test EN ISO 9969
- Ring stiffness DIN 16961
- Creep ratio according to ISO 9667
- Abrasion test according to Darmstadt procedure





■ International Standards

ISO

ISO/AWI 29561-1

Plastics piping systems -- Glass fibre reinforced polyethylene (PE-GFR) piping systems for water supply -- Part 1: General

ISO/AWI 29561-2

Plastics piping systems -- Glass fibre reinforced polyethylene (PE-GFR) piping systems for water supply -- Part 2: Pipes

ISO/AWI 29561-3

Plastics piping systems -- Glass fibre reinforced polyethylene (PE-GFR) piping systems for water supply -- Part 3: Fittings





■ Production Line

Cross Winding

Principle of winding process

1. Extrusion die head
2. Production tool

