Welcome to Bänninger Group

PP-R
PP-RCT
PE100
PVC-U



Made in Germany

Bänninger Kunststoff-Produkte GmbH - Reiskirchen



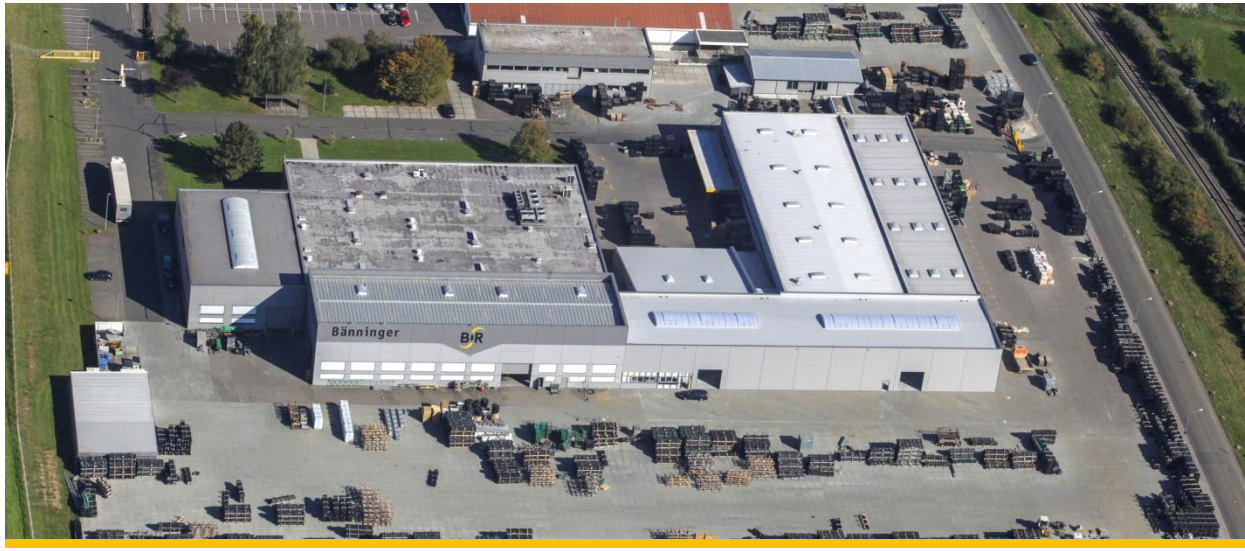
Head Office & Production Reiskirchen Germany (Hesse)

Our headquarter with central warehouse as well as the production facility for PVC-U fittings is located at Reiskirchen in Germany, Federal State of Hesse, 60km north of Frankfurt.

Injection moulded PE and PP-RCT fittings up to a dimension of d500 and PVC-U fittings up to a dimension of d315 are being produced in this facility as well.



Head office - Reiskirchen Germany



Production & storage facility - Reiskirchen Germany

Factory Stassfurt (Saxony-Anhalt)

The PP-R/PP-RCT pipes and fittings are produced at Stassfurt, Federal State of Saxony-Anhalt by Bänninger Rohrleitungssysteme GmbH, which is a 100% subsidiary of Bänninger Kunststoff-Produkte GmbH, Reiskirchen.

PP-R and PP-RCT pipe systems in dimensions up to d500 are manufactured in this Bänninger facility near Magdeburg.



Production in Stassfurt Germany – Plant 1 for pipes



Production in Stassfurt Germany – Plant 2 for fittings

Branches

Germany

Bänninger Kunststoff-Produkte GmbH
Reiskirchen

Bänninger Rohrleitungssysteme GmbH
Stassfurt

Poland

Bänninger Reiskirchen Polska Sp.
Warzawa

Bänninger Formtechnik sp. z-.o.o.
Czestochowa

Romania

BSR Bänninger Romania srl
Thermoplastic fittings valves
Baia Mare

United Arab Emirates

Production facility Baenninger Middle East L.L.C.
Dubai

Baenninger Trading L.L.C.
Dubai

United States of America (USA)

Baenninger Incorporated; New York

Distribution

Germany

- 12 commercial agencies with 18 field representatives
- 1 local representative
- 1 application engineer
- 1 engineer for international products standardisation

National & International Sales

- 76% sales in exports
- 24% domestic market

Foreign countries

- Agents
- Exclusive distributors
- Whole sellers



Bänninger - History



BR Headquarters in 1968

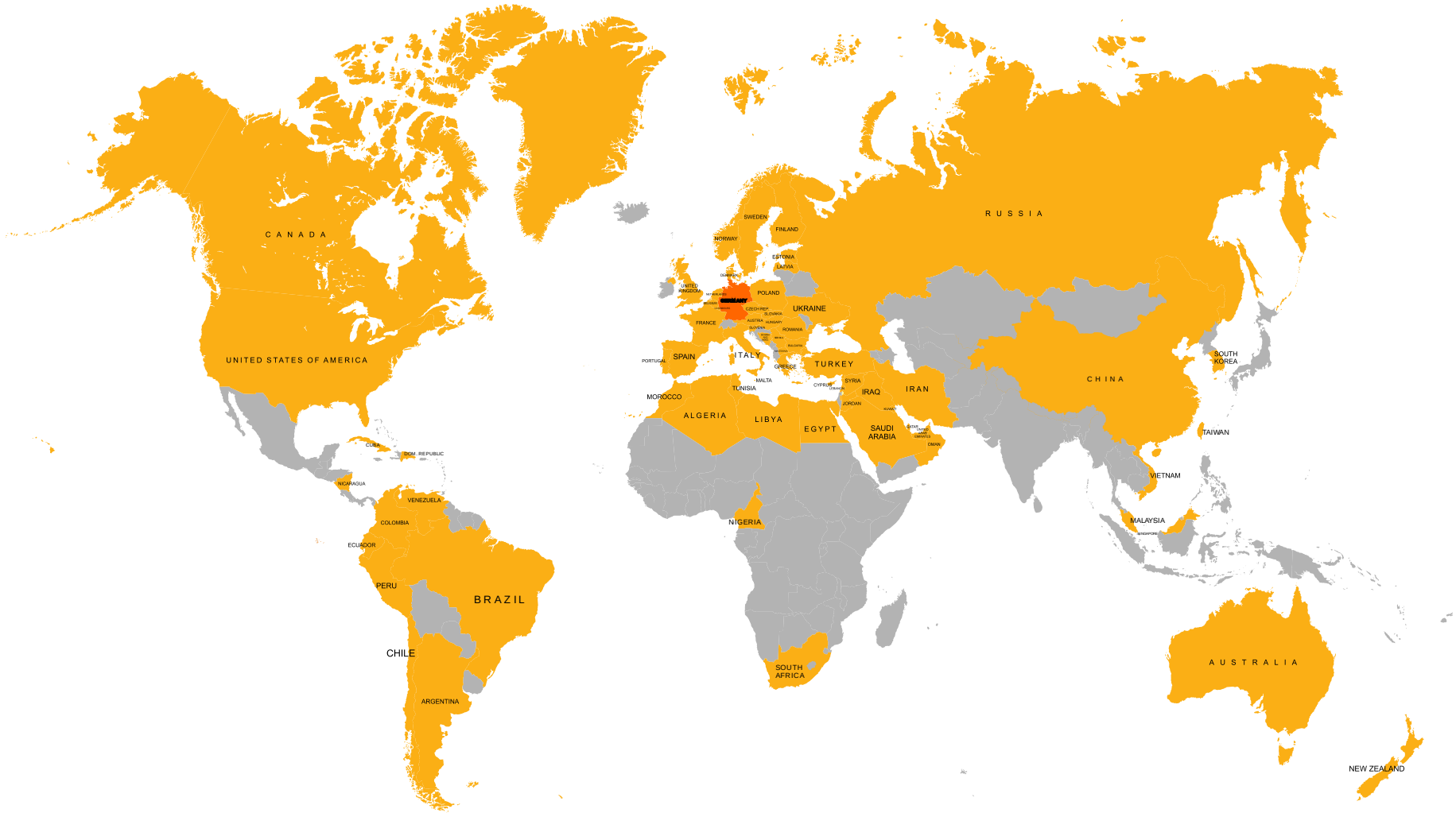


BR Headquarters in 1989



BR Headquarters in 2003

Bänninger Worldwide



Our Strengths

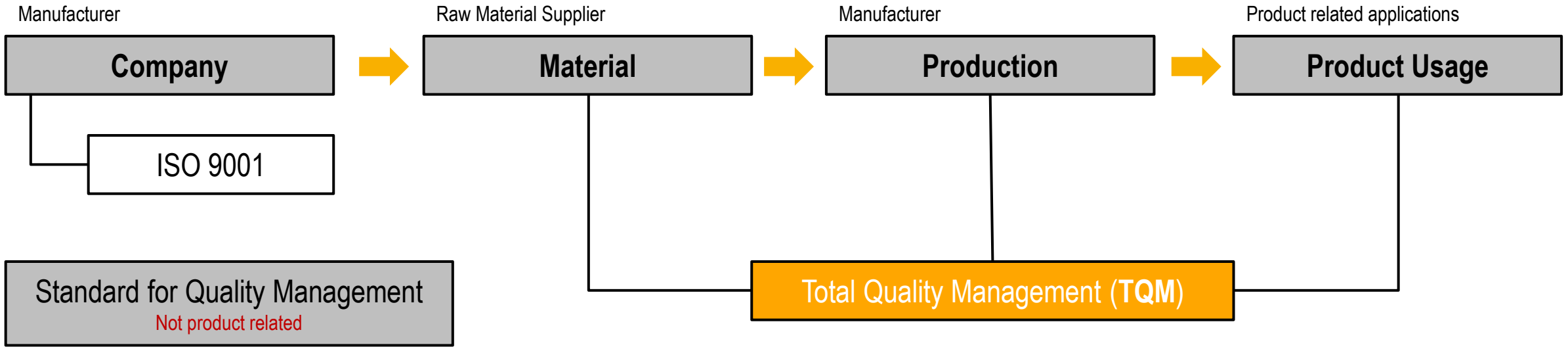
- Highest flexibility
- First class customer service and technical support
- High ratio of delivery in time because of stock availabilities
- Proactive product development
- Independent from tool suppliers
- Customized solutions
- Strategic partners worldwide
- Reasonable prices for high quality products



Bänninger Certified Quality Worldwide



Internal Quality Process



Certification from third parties are the best indicators for product quality.



One System - Various applications

Made in Germany

The New Generation of Pipe Systems



PP-RCT

Applications



Potable water/ sanitary applications



Ship building



Industrial applications



Air-conditioning & cooling systems

PP-RCT Piping Systems

Colour: RAL 6024 Traffic Green

Dimensions: d20 – d500

Working pressures: For cold water at 20°C up to 20bar
For hot water at 70°C up to 10bar
For heating at 70°C up to 3bar

- All threaded fittings have red brass inserts (copper/zinc/tin alloy)
- Red brass is also know as gunmetal or bronze
- All Fittings are injection moulded
- Fittings available in PP-R & PP-RCT
- Various types of pipe



PP-RCT piping systems manufactured by Baenninger

Made in Germany

PP-RCT – „The Raw Material Innovation of Borealis“

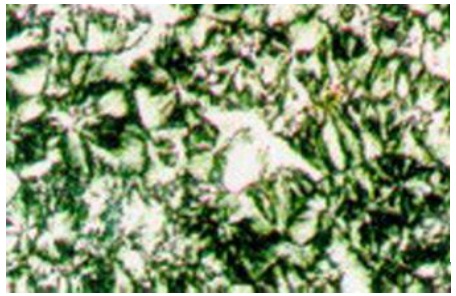
PP-RCT (**P**oly**p**ropylene - **R**andom-**C**rystalline structure **T**emperature resistance)

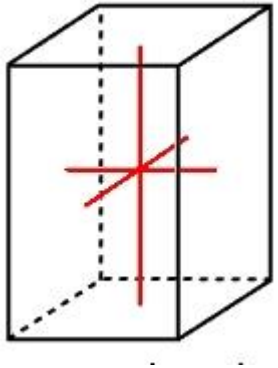
- New generation of raw material leads to a new material class called PP-RCT
- Modified crystalline structure leads to higher pressure resistance at high temperatures.

BOREALIS

Standard PP-R

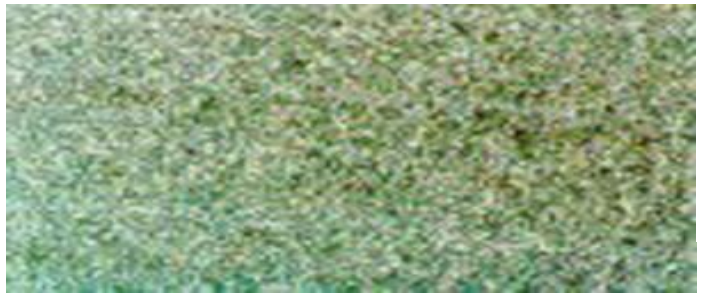
Alpha α-structure crystal (monocline)

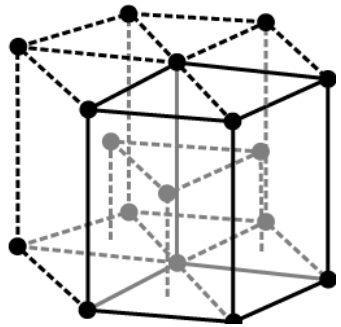




New PP-RCT

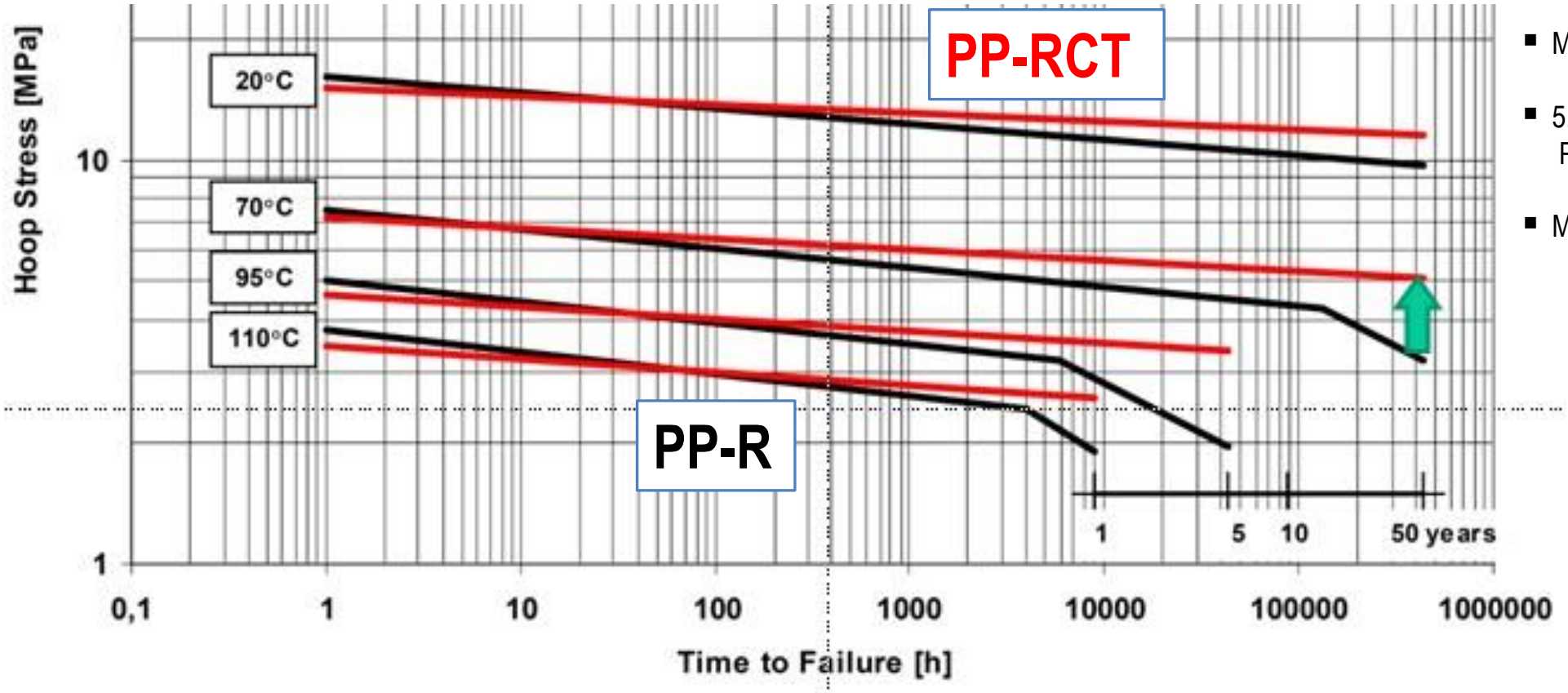
Beta β-structure crystal (hexagonal)





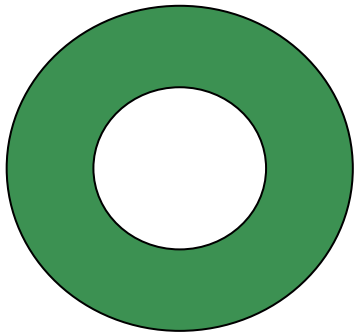
Reference Curves PP-RCT vs. PP-R

The curves define the required hydrostatic pressure performance of the materials.



- Massive improvement in strength
- 5.0MPa at 70°C (50 years lifetime)
  PP-R = 3,2MPa
- More than 50% stronger than PP-R

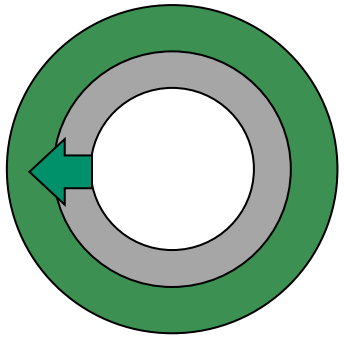
Advantages - Flow Capacity

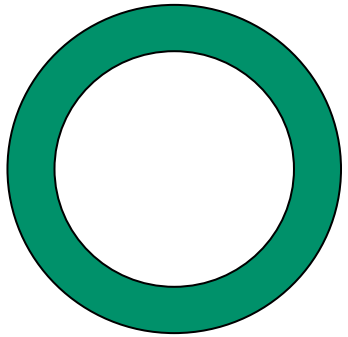


G 8200 - SDR 6

Pipe **PP-R**
d75 x 12,5mm
p = 20bar*

SDR 6 ⇨ SDR 7,4





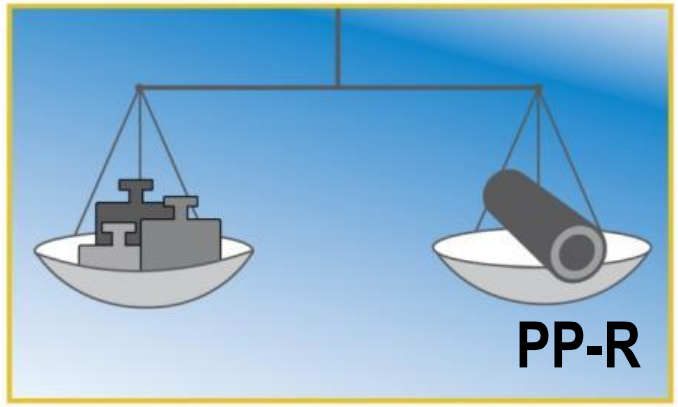
G 8200B - SDR 7,4

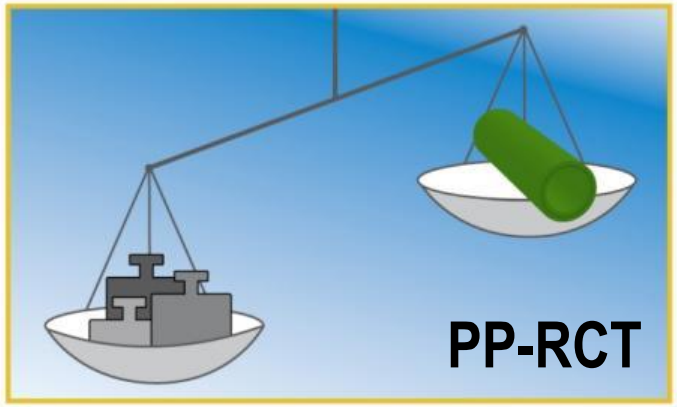
Pipe **PP-RCT**
d75 x 10,3mm
p = 20bar*

+17% higher flow

* with water at 20°C

Advantages – Weight SDR 6 ⇨ SDR 7.4





Pipe d75	PP-R G8200 SDR 6 2,500kg/m	PP-RCT G8200B SDR 7.4 1,987kg/m	Weight Reduction	
500m	1,250.0kg	993,5kg	- 256.5kg	- 20.5%
1,000m	2,500.0kg	1,987.0kg	- 513.0kg	- 20.5%

PP-RCT

DIN 8077 (Measures) / DIN 8078 (Quality)

B-R Bänninger

Material	SDR	SF	20°C (=PN)	40°C	70°C
			Allowable operating pressure [bar]		
PP-H	7,4	1,6/1,4/1,25*	19,7 (20)	15,9	7,6
PP-B	7,4	1,25	22,0 (20)	14,6	4,5
PP-R	7,4	1,25	24,5 (20)	17,4	8,1
PP-RCT	**7,4**	**1,25**	**29,2 (20)**	**21,5**	**12,9**

*
1-39°C = Safety factor 1,6
40-59°C = Safety factor 1,4
From 60°C = Safety factor 1,25

All PN20!

PP-RCT

Our pipes for your requirements



PP-RCT Standard Single Layer Pipes for various Applications

Colour: traffic green RAL6024

PP-RCT 8200B Single layer

- Dimensions: d20 – d125
  - 20°C/2.0MPa 70°C/1.0MPa

- PP-RCT Single layer pipe
- Lowerr wall thickness compared to 8200 PP-R
- Higher pressure at higher temperatures compared to 8200 PP-R
- Less weight for easier installation



Standard PP-RCT pipe 8200B

- *d20 – d125 SDR7.4*

Made in Germany

PP-RCT Standard Single Layer Pipes for various Applications

Colour: traffic green RAL 6024

PP-RCT 8160B Single layer

- Dimensions: d20 – d500
- 20°C/1.6MPa 60°C/0.8MPa

- PP-RCT Single layer pipe
- For applications with lower pressure



Standard PP-RCT pipe 8160B

- *d20 - d25 SDR9*
- *d32 – d500 SDR11*

Made in Germany

PP-RCT Fibre Pipes – Watertec

Colour: green with light-grey stripes

PP-RCT 8200FW Watertec

- Dimensions: d20 – d500
  - Up to d125 at 20°C/2.0MPa 70°C/1.0MPa
  - From d160 at 20°C/1.6MPa 70°C/0.8MPa

- Multilayer Pipe (3 layers)
- Patented middle layer fibre composite + PP-RCT
- For hot water applications
- Considerable reduction at thermal expansion:
- Coefficient = 0.035mm/m/°C



Fibre compound pipe of PP-RCT with inner fibre layer (patented)

- *d20 - d25 SDR7.4*
- *d32 – d125 SDR9*
- *d160 – d500 SDR11*

Made in Germany

PP-RCT

PP-RCT

PP-RCT Fibre Pipes – Climatec

Colour: green with red-brown stripes

PP-RCT 8160FC Climatec

- Dimensions: d20 – d500
  - Up to d125 at 20°C/1.6MPa 70°C/0.8MPa
  - From d160 at 20°C/1.0MPa 70°C/0.5MPa

- Multilayer Pipe (3 layers)
- Patented middle layer fibre composite + PP-RCT
- For hot water applications
- Considerable reduction at thermal expansion: Coefficient = 0.035mm/m/°C



Fibre compound pipe of PP-RCT with inner fibre layer (patented)

- *d20 - d25 SDR7.4*
- *d32 – d125 SDR11*
- *d160 – d500 SDR17*

Made in Germany

PP-RCT

PP-RCT Aluminum coated – Stabi Pipes

Colour: traffic green RAL 6024

PP-RCT 8215B Stabi pipe

- Dimension: d16 – d125
- Up to d125 at 20°C/2.0MPa 70°C/1.0MPa

- Aluminium coating to reduce linear expansion
- PP-RCT for better pressure behaviour at higher temperatures
- Peeling tools for installation necessary



Stabi compound pipe made of PP-RCT with aluminium shell

- *d16, d20 SDR7.4*
- *d25 – d125 SDR9*

Made in Germany

PP-RCT UV-protected Pipe according to DIN EN12108

Colour: black

Available for PP-RCT

SB-8200F Multilayer plus UV protection Dimension d20 – d225

SB-8215B Stabi pipe plus UV protection Dimension d20 – d110

- UV protection foil working under European conditions
- Black UV protection foil is made of black PE
- 3% carbon black



Picture SB-8215B. UV protection for pipes directly exposed to sunlight

- *SDR Class depending on the type of pipe*

Made in Germany

PP-RCT

PP-RCT Lilac Pipe - ECOTEC

Colour: lilac

PP-RCT 8160L Lilac double layer

- Dimension: d20 – d110
- Up to d110 at 20°C/1.6MPa 70°C/0.8MPa

- Double layer PP-RCT Pipe
- Recycled and treated water in New Zealand and Australia



Ecotec pipe 8160L is used in many applications in Australia and New Zealand

- *D20 - 25 SDR9*
- *d32 – 110 SDR11*

Made in Germany



PP-RCT

Our threaded fittings for your requirements

Made in Germany

Inserts made of red brass (gun metal)



Stress corrosion resistant, surface is protected against ion discharge - no need for any coating.



No nickel plated fittings because of health hazard!

Yellow brass shows a higher stress corrosion rate

- **New type with smallest dead water zone**
- **Suitable for unfavourable water conditions**

Made in Germany

Technical Details – Red Brass

Red Brass

Consisting of:

- Cu (Copper) between 84 and 86%
- Zn (Zinc) between 4.0 and 6.0%
- Pb (lead) between 2.0 and 6.0%
- SN (tin) between 4.0 and 6.0%

- No dezincification
- No corrosion
- High quality material

Yellow Brass

Consisting of:

- Cu (Copper) minimum 50%
- Zn (Zinc) maximum 44%
- Pb maximum 3%

Dezincification:

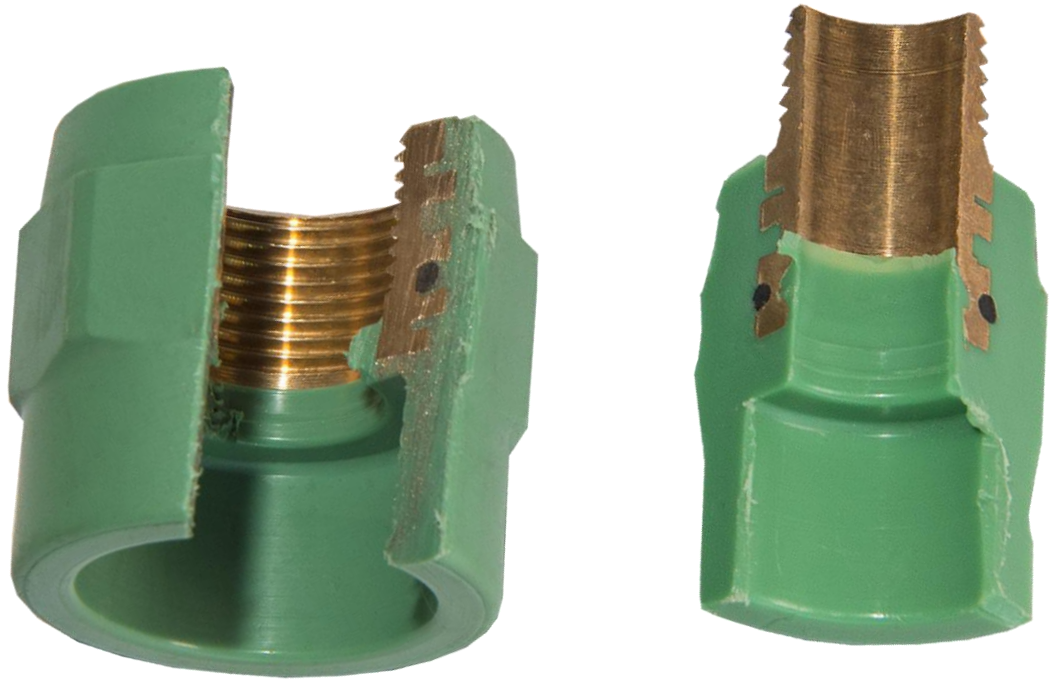
Zinc will be dissolved from the thread which leads to the separation of copper. The corroded parts are not resistant to mechanical usage anymore.

Nickel plating: forbidden because of health issues

Extruded material inside the thread: Scared of corrosion because of a bad quality thread.

Red brass inserts – Advantage Bänninger

- No corrosion
- No incrustations
- No desincification
- Extraordinary chemical resistance
- Lifetime minimum 50years
- High weight
- Highest possible flow rate
- Gaskets for higher density and no leakage
- Certified as intended for human consumption

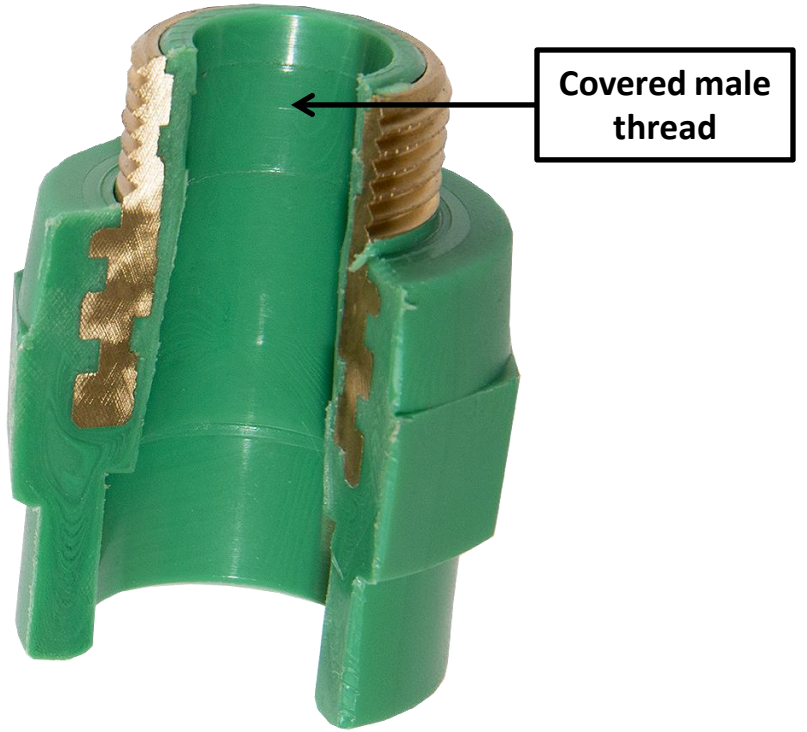


Made in Germany

Various types of inserts – available in the markets

- Covered male threads because of metal quality
- Reduced flow rate
- Smooth flow
- No gasket
- Yellow brass, stainless steel requires further testings
- Chrome plating
- Nickel plating forbidden in Europe





PP-RCT

Our Valves for your requirements



Made in Germany

PP-RCT

PP-RCT Ball Valve – New Generation G-8850B

Description: A **ball valve** is a quarter-turn valve which uses a hollow and plastic (PP-RCT) ball to control flow through it.

- Full bore of ball valve adapted to the inner diameter of the pipe. Ball valve is suitable for close off in industrial and sanitary plants

Sizes: d20-63mm – bigger sizes under process

Nominal pressure: 20bar for water at 20°C
10bar for water at 70°C

Advantages:

- High resistant against media
- Optimized sealing system:
  - Flexible seal gasket even for contact pressure of the ball sealing against the full floating
- Highly operational reliability



Made in Germany

Angle Seat Valve – PP-R/Brass – G 8650, G 8655, G 8655/1

Description:

An **angle seat valve** is a pneumatically-controlled valve. Type 8650, 8655 and 8655/1 are having a PP-R body with red brass threads for a threaded connection.



Made in Germany

Sizes: d20-40mm

- Available with and without backflow preventer
- Available with and without draining connection

Advantages:

- Plastic body for highest flow rates
- No corrosion compared to cheaper types of metal

Angle Seat Valve – Brass/PP-R – G 8600 and G 8600/1

Description:

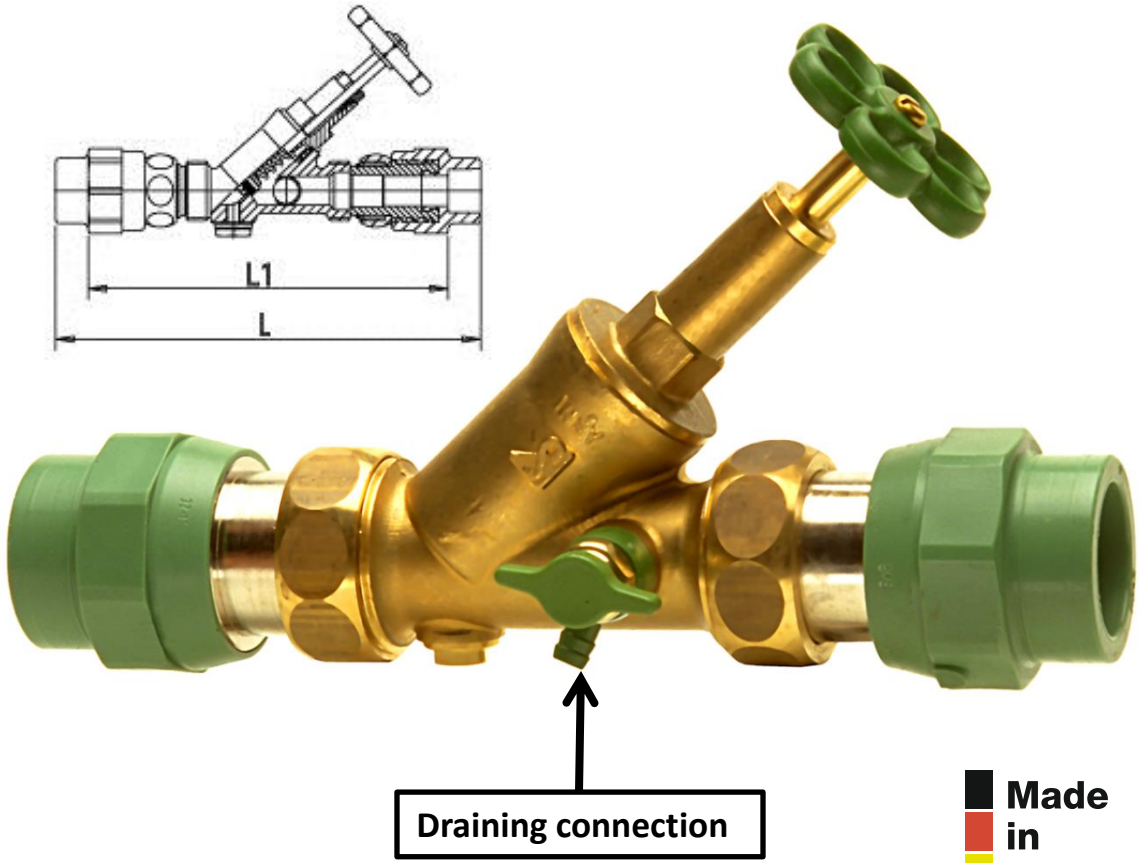
An **angle seat valve** is a pneumatically-controlled valve. Type 8600 and 8600/1 are having a red brass body with PP-R sockets for connection.

Sizes: d50 and 63mm

- Available with and without backflow preventer
- Available with and without draining connection

Advantages:

- Higher pressure rating



Angle Seat Valve short – PP-R – G 8700 and G 8700/1

Description:

An **angle seat valve** is a pneumatically-controlled valve. Type 8700, 8700/1 are having a short PP-RCT(PP-R) body with sockets for connection.



Sizes: d20-40mm

- Available with and without backflow preventer
- Available with and without draining connection

Advantages:

- Short type suitable for tight areas
- Less material for better pricing

Made in Germany

Concealed Valve – PP-RCT(PP-R) G 8599a (bottom), G 8599b, 8599c, 8599d top)

Standard bottom part + 3rd possible types of upper part

G 8599b upper part 8599/1 winged wheel and closed flap



G 8599c upper part 8599/2 straight seat valve



G 8599d upper part 8599/3 concealed valve (chrome plated)

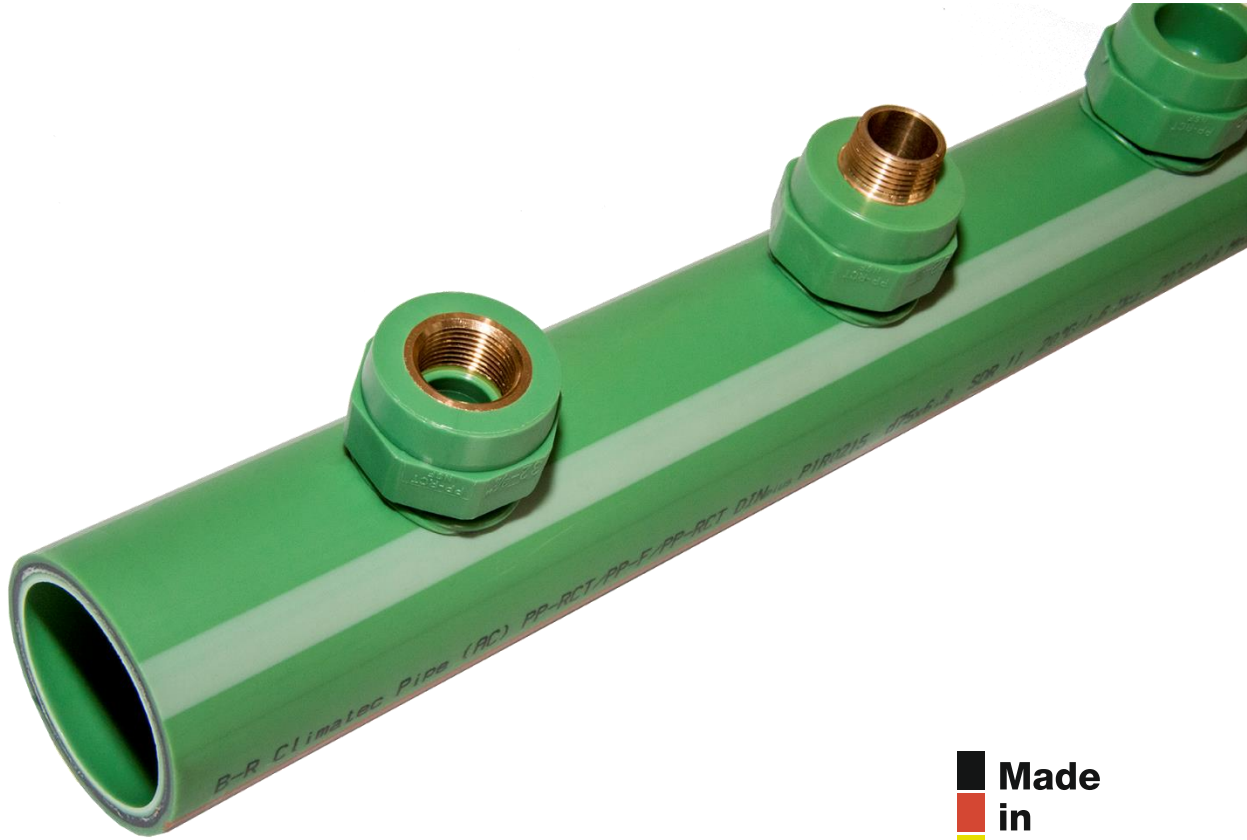




Made in Germany

PP-RCT

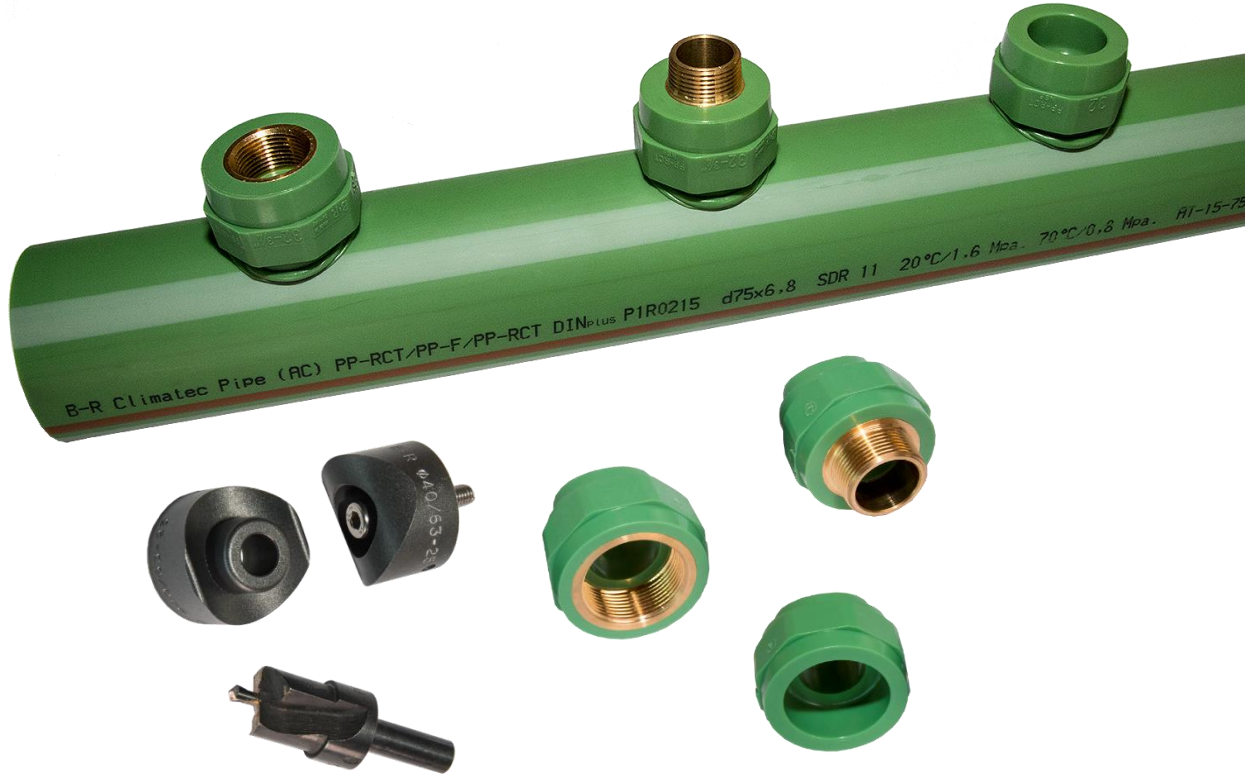
Our Weld-in saddles for your requirements



Made in Germany

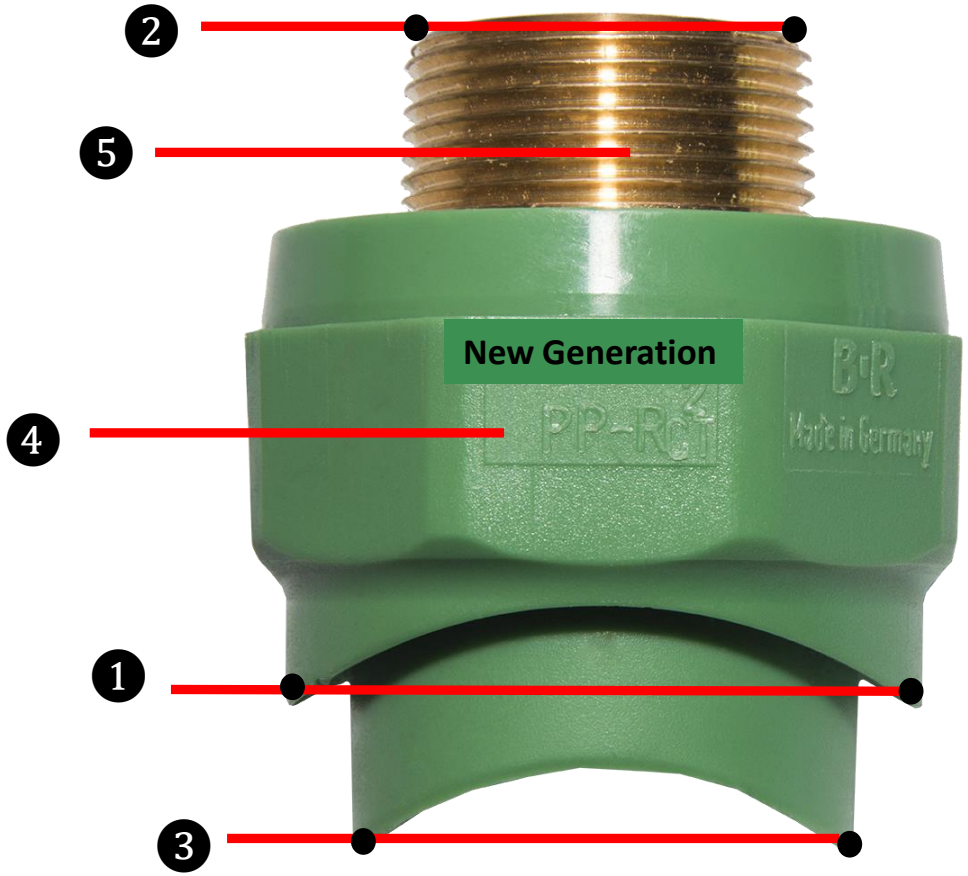
Advantages – Bänninger Weld-in Saddles

- **One Saddle** for **many pipe sizes**
- Easy to create branches for **existing pipelines**
- **Maximum reduction** from d630mm to d20mm with **one weld**
- Maximum reduction to 1/2“ metal threaded connection
- **Alternative** for a tee or reduced tee
- Manifold construction



Required information for saddles

1. OD of the pipe – 4 basic versions
   - d40-63mm
   - d75-125mm
   - d160-250mm
   - d315-630mm
2. Outled with available sizes:
   - Male: ½ – 2”
   - Female: ½ – 2”
   - Socket: d 20 - 63mm
3. Size of the bore
   - d20 – 63mm
4. Body made of PP-RCT
5. Threads (male and female) are made of red brass/ gun metal



Bänninger Saddles – Highest Flexibility

One saddle type fits **multiple diameter pipes**

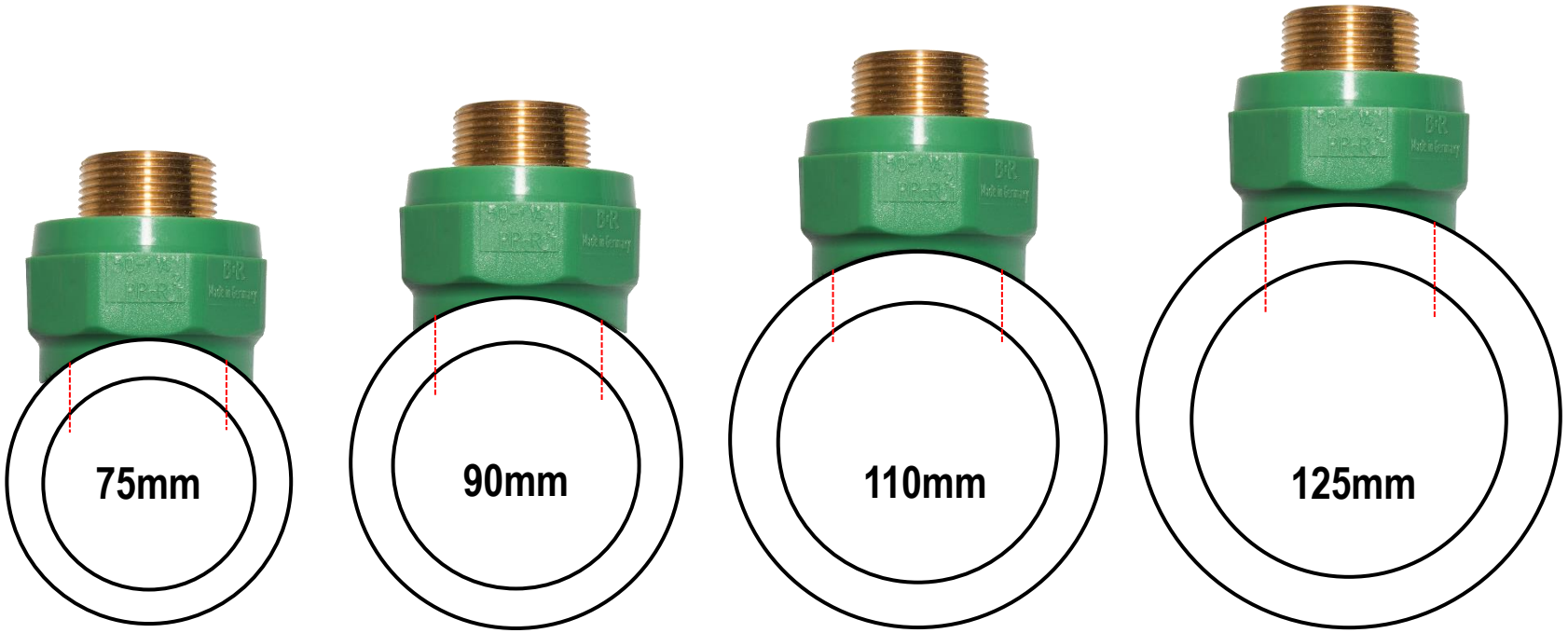
Example:

Saddle **male** thread:

Diameter of the pipe: d75-125mm

Outlet: 1 1/4 ”

Bore: d40mm



Bänninger Saddles – Highest Flexibility

One saddle for different pipe sizes

- Different bores for customized requirements
- For pipes from d40 – 630mm
- Outlets: d20 – 63mm
- Type: For socket welding
- Classified as SDR6



Made in Germany

Bänninger Saddles – Highest Flexibility

One saddle for different pipe sizes

- Different bores for customized requirements
- For pipes from d40 – 630mm
- Outlets: ½ - 2”
- Type: Male threaded connection
- Classified as SDR6



Made in Germany

Bänninger Saddles – Highest Flexibility

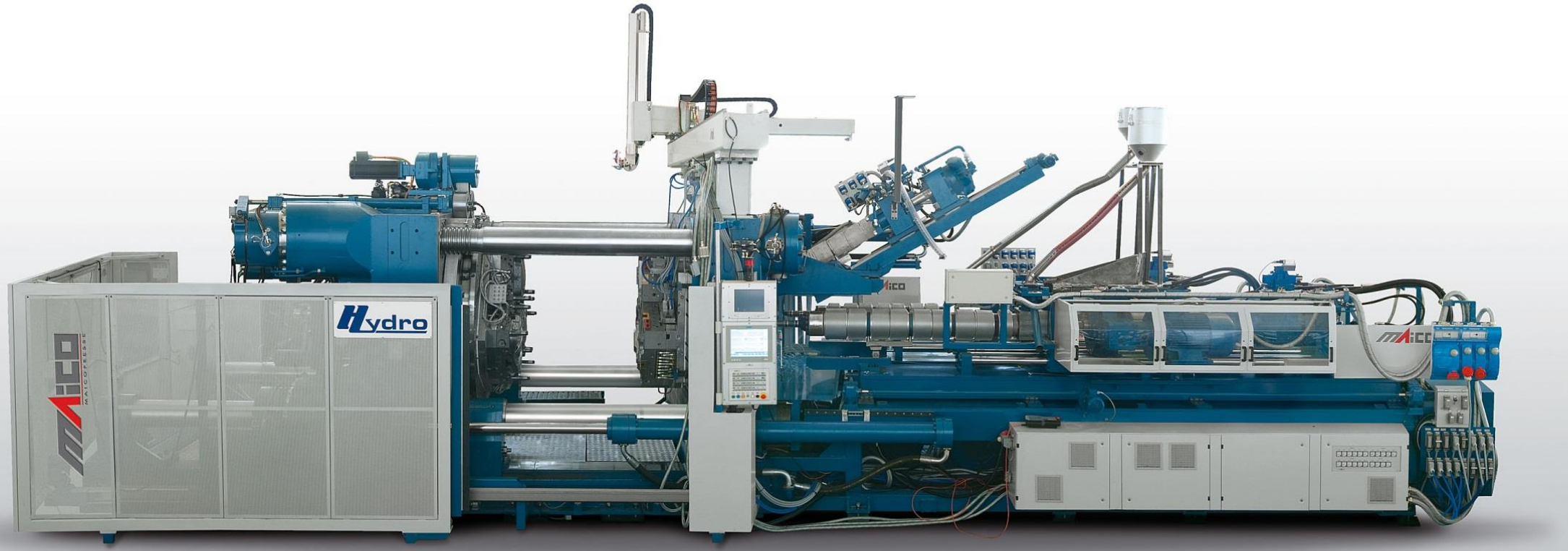
One saddle for different pipe sizes

- Different bores for customized requirements
- For pipes from d40 – 630mm
- Outlets: ½ - 2”
- Type: Female threaded connection
- Classified as SDR6



Made in Germany

Injection Moulded vs. Fabricated/Segmented



Injection Moulded Fittings – Fully rated according to ISO 4427-3

- Injection moulded fittings have the full pressure range of the pipes.
- No pressure loss for elbows or tees.
- No inner beads which causing additional pressure loss. Bänninger fittings have very special inside and outside design with smooth transitions. Feel the difference!
- This smooth transitions with perfect rounding outside and inside are perfect for high flow rates.



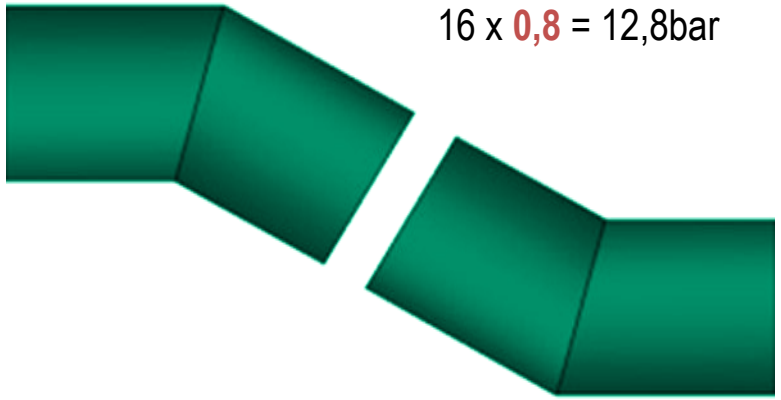
Fitting	Derating Factor	SDR 17	SDR 11
Elbow 45°, 90°	1	10 bar	16 bar
T-piece	1	10 bar	16 bar



System Pressures (Segmented vs. Injection)

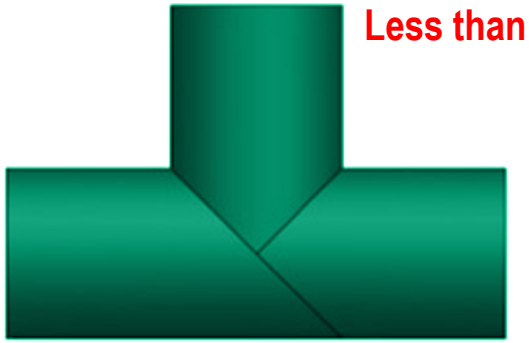
Pipe PP-RCT
SDR 11
16bar, 20°





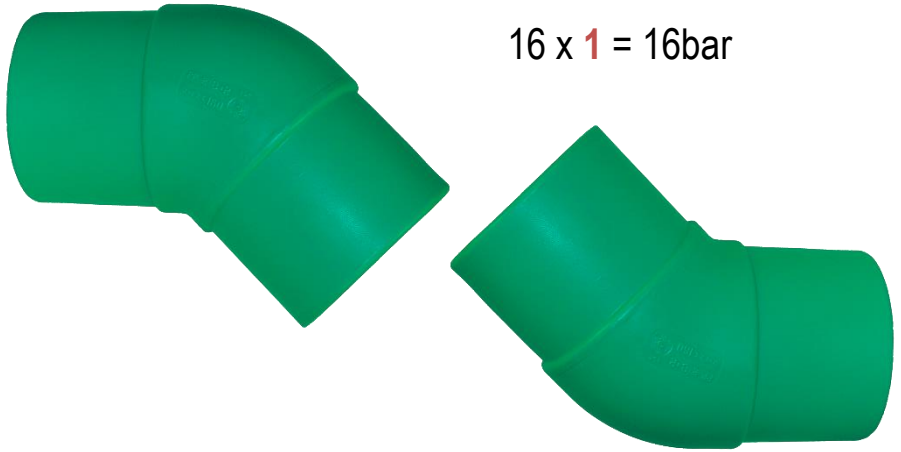
16 x **0,8** = 12,8bar

16 x **0,5** = **8bar**
Less than SDR 17!



Pipe PP-RCT
SDR 11
16bar, 20°





16 x **1** = 16bar

16 x **1** = **16bar**
Full pressure!



Segmented vs. Injection Moulded Fittings

Segmented

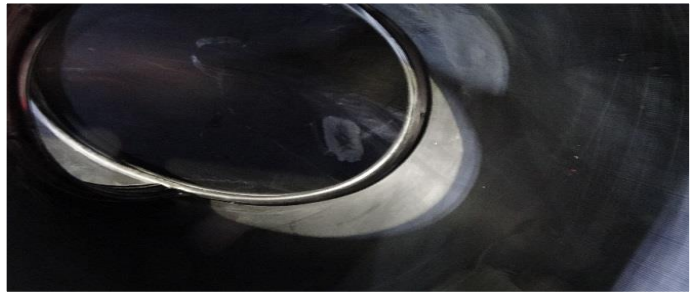
+ Easy and cost efficient in production
+ Weight of pipes
+ High availability in the market

- Inner beads and high pressure loss
- High risks regarding damages
--- Considerable amount of pressure reduction

Injection moulded

- Complex and more expensive in production
- Higher weight than pipes
- Longer production time, less manufacturers

+ No additional inner beads and less pressure loss
+ No risks regarding damages
+++ No pressure reduction







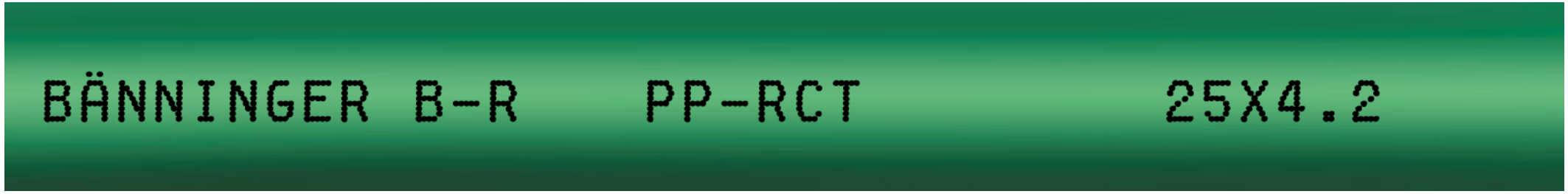


PP-RCT

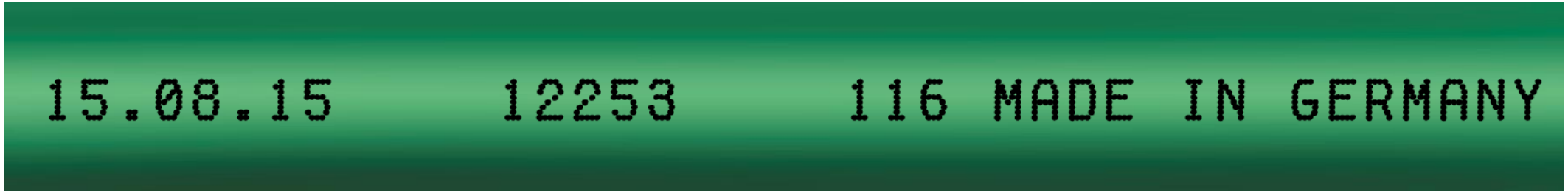
Bänninger PP Pipes – Labelling according to ISO15874-3

B-R Bänninger

❶ Manufacturer ❷ Material ❸ Dimension



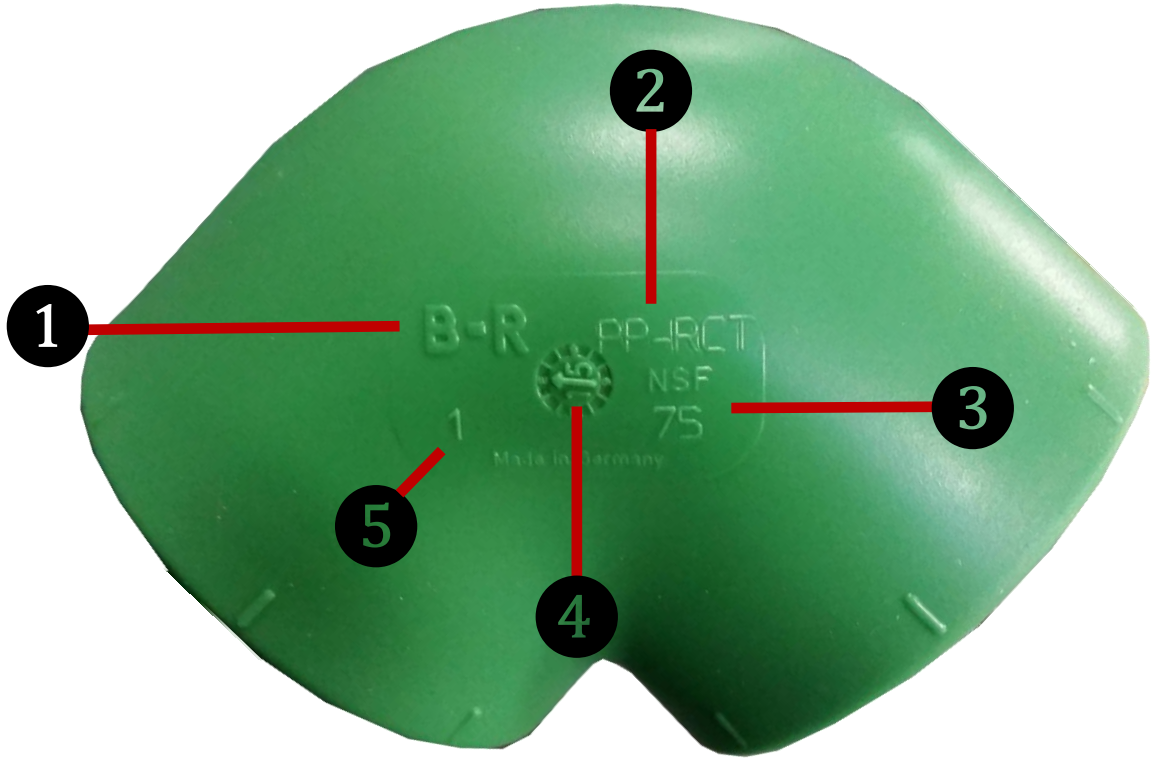
Approvals



❹ Production date ❺ Running meter

Made in Germany

Bänninger PP Fittings – Labelling according to ISO15874-3



1. Manufacturer
2. Material
3. Dimension
4. Production date (required for Internal Inspection Certificate
5. Internal information only (not required)

Made in Germany

PP-RCT

Advantages of PP-RCT Pipes & Fittings

B-R Bänninger

- New material with improved properties compared to PP-R
- That means thick walls will bee thinner and a higher flow of up to +17% can be realized.
- Less weight by reduced wall thickness.
- PP-RCT can be welded or installed together with PP-R.
- Perfectly compatible with existing PP-R fitting ranges.
- All other characteristics are identical with PP-R.
- With reduced wall thicknesses same pressure stages can be realized compared to the standard PP-R material
- PP-RCT is approved and certified.
- Economic efficiency. The combination of higher flow capacity, lower size and less weight offer a substantial cost advantage for the installation.
- Insert made of bronze for no corrosion

Made in Germany

Advantages Bänninger PP-RCT

- Bänninger is the **only manufacturer worldwide** with a certified PP-RCT pipe system up to d500
- Injection moulded solutions for **full rated** applications
- **Customized solutions** suitable for most pressure applications
- **Available** in most regions all over the globe



PP-RCT References



Ministry of Interior - Doha

Country: **Qatar**

Year: **2004**

Contractor: **Power Mechanical Engineering**

Stores:

Consultant: **Consultant Engineering Group (C.E.G)**

Products: **PP-RCT & PP-R**

The biggest governmental project in Qatar from 2000 until 2013.



Queen Alia Airport - Amman

Country: **Jordan**

Contractor: **Sadeen Contractors**

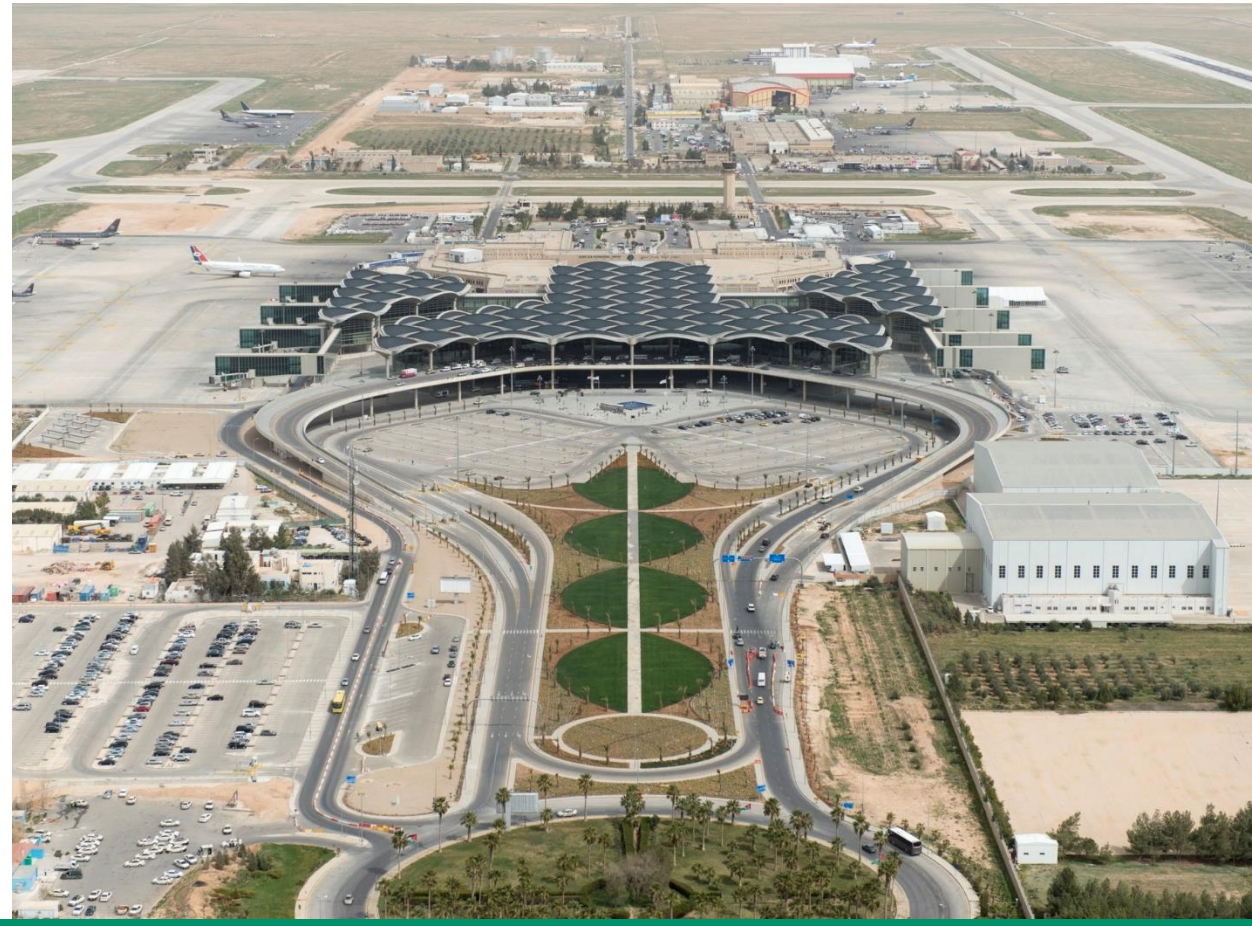
Consultant:

Products: **PP-RCT**

Discharge

Year: **2012**

Stores: **6**



PP-RCT

Al Hikmah Tower - Dubai

Country: **United Arab Emirates**

Year: **2012**

Contractor: **China State Contracting**

Stores: **64**

Consultant: **Arex Consulting**

Products: **PP-RCT & PP-R**

Located in Business Bay Area close to Sheikh Zayed Road



King Abdullah Finance District - Riyadh

Country: **Kingdom of Saudi Arabia**

Contractor: **Bin Ladin Contracting**

Consultant: **Various**

Products: **PP-RCT & PP-R**

Year: **2010 - 2015**

Stores: **Different**

32 Tower buildings full BR PP-RCT & PP-R materials.

Customer wants to be on the safe site.



Rotana Hotel - Amman

Country: **Kingdom of Jordan**

Year: **2012**

Contractor: **Arabian Construction Company**

Stores: **55**

Consultant: **Sigma Consulting Engineers**

Products: **PP-RCT**

The biggest hotel project in Amman. Highest quality of engineering backed up by technical consulting of Bänninger Germany.



Sugar Factory

Country: **Ukraine**

Year: **2009**

Contractor: **Various**

Stores:

Consultant: **Through Romstal Ukraine**

Products: **PP-RCT**

Watertec up to d250mm

Relining of an existing steel pipe system – media too aggressive for steel



Standard System for In-house Pressure Water



Applications



Potable water/ sanitary applications



Ship building



Industrial applications

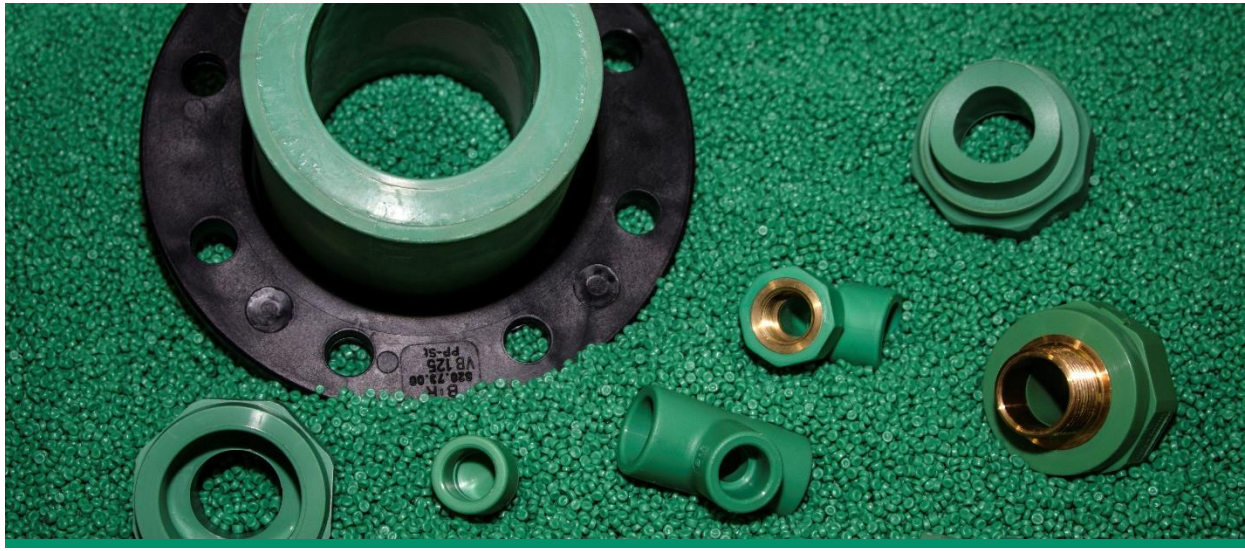


Air-conditioning & cooling systems

PP-R Standard Single Layer Pipes for various Applications

Colour:	RAL6017 May Green	
Dimensions/type:	d20 up to d63	
Working pressure:	Cold water	20°C up to 20bar
	Hot water	70°C up to 10bar
	Heating	70°C up to 3bar

- Drinking water
- Hot water
- Heating
- Sanitary applications



PP-R piping systems manufactured by Baenninger

Made in Germany

Steel flanges with PP coating according to DIN EN 1092

Flanges with PP coating, glas fiber with metal insert manufactured acc. to DIN EN 1092

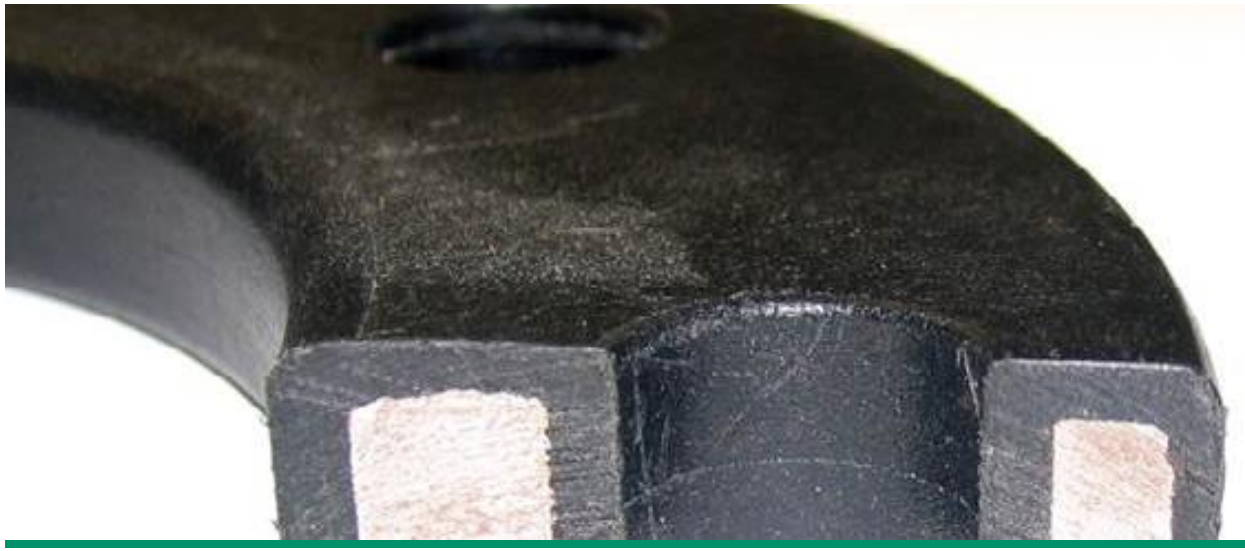
Drilling and pressure rating

620.75.00 from d40 up to d160 mm drilled/ resistant to PN16

620.75.VB from d160 up to d500mm drilled/ resistant to PN10

620.75.KL from d110 up to d125mm drilled/ resistant to PN10

For flaps d140mm 620.75.KL in d125mm is required!



Steel flange with PP coating

Made in Germany

Bänninger PP Fittings – Labelling according to ISO15874-3



1. Producer
2. Material
3. Dimension
4. Production date (required for Internal Inspection Certificate)
5. Internal information only (not required)

Made in Germany

Ministry of Interior - Doha

Country: **Qatar**

Year: **2004**

Contractor: **Power Mechanical Engineering**

Stores:

Consultant: **Consultant Engineering Group (C.E.G)**

Products: **PP-R & PP-RCT**

The biggest Governmental project in Qatar from 2000 until 2013.



King Abdullah Finance District - Riyadh

Country: **Kingdom of Saudi Arabia**

Contractor: **Bin Ladin Contracting**

Consultant: **Various**

Products: **PP-RCT & PP-R**

Year: **2010-2015**

Stores: **Different**

-



PP-R Grey Colour for Industrial Applications



Applications



Chemical industrie



Ship building



Industrial applications



Air-conditioning & cooling systems

PP-R

PP-R Standard Single Layer Pipes for various applications

B-R Bänninger

Colour:	RAL7032 industrial grey	
Dimensions/type:	d20 up to d500 socket welding from 20 up to d110mm butt welding from d25 up to d500mm	
Working pressure:	SDR11	Cold water 20°C up to 10bar
	SDR11	Hot water 70°C up to 10bar

- Chemical industry such as
- Acid applications
- Pickling plants
- Bio gas plants
- Hot water



PP-R piping systems in grey for industrial applications are manufactured by Baenninger

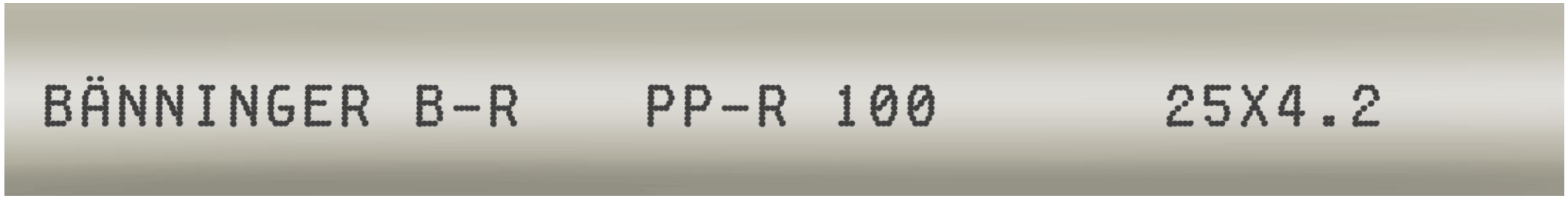
Made in Germany

PP-R

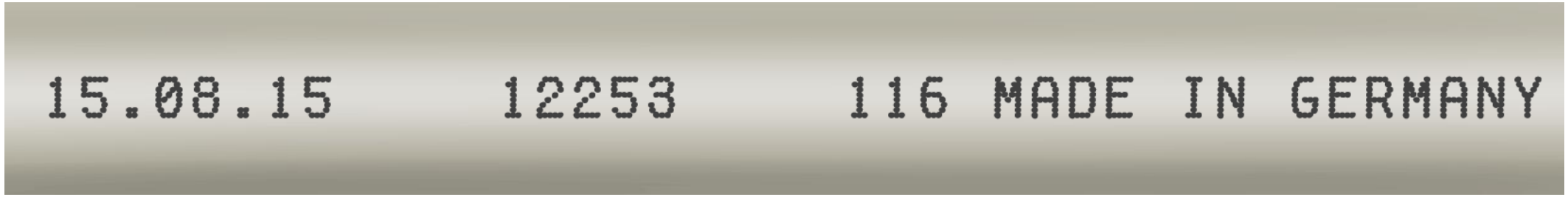
Bänninger PP Pipes – Labelling according to ISO15874-2

B-R Bänninger

❶ Manufacturer ❷ Material ❸ Dimension



Approvals



❹ Production date ❺ Running meter

Made in Germany

Bänninger PP Fittings – Labelling according to ISO15874-3



1. Producer
2. Material
3. Dimension
4. Date of Production (required for Internal Inspection Certificate)
5. Internal information only (not required)

made in Germany

Injection moulded Fittings for Full-Pressure



Applications



Potable water



Gas supply



Industrial applications



Drainage & Sewage

HDPE100 Pipes & Fittings

Colour: High density Polyethylene - PE100 black colour

Dimensions/type: PE100 fittings are available from
d25 up to d500 injection moulded – long version
d25 up to d1000 injection moulded – short version

Working pressure: SDR11 equal to 20°C 16bar water
SDR17 equal to 20°C 10bar water

Specifications:

- Injection moulding for fully rated applications
- Full system spigot fittings available as
  - SDR11 long – Suitable for electro fusion
  - SDR11 short
  - SDR17 long – Suitable for elector fusion
  - SDR17 short



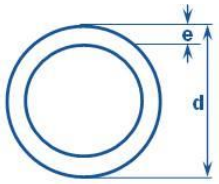
Polyethylene 100 fittings manufactured by Bänninger

Made in Germany

SDR - Standard Dimension Ratio

Classification for plastic standards

$$SDR = \frac{Outside\ Diameter}{Wall\ thickness} = \frac{d\ 110\ mm}{e\ 10\ mm} = 11$$



S-Pipe Series

Classification for plastic standards

$$S = \frac{SDR - 1}{2} = \frac{11-1}{2} = 5$$

PN for PE types (20°C, 50 years, water

MOP for PE types 20°C. 50years, Gas

SDR	PE 63	PE 80	PE 100	PE 80	PE 100
7,4		20,2bar	25bar		
11		12,5bar	16bar	4bar	10bar
17	6,3bar	8,0bar	10bar	1bar	4bar
17,6				1bar	4bar

PE100

Maximum Operating Pressures PE100

B-R Bänninger

- Pipes and Fittings
- Flow medium = Water
- Safety factor for all tables = 1,25

SDR 11 – Operating Pressure [bar]

Temp [°C]	Year of Operation				
	5	10	25	50	100
10	20,2	19,8	19,3	19,0	18,7
20	16,9	16,6	16,2	**16,0**	15,7
30	14,4	14,1	13,8	13,5	
40	12,3	12,1	11,8	11,6	
50	10,7	10,4	9,5		
60	7,7				

PE80 = 12,5bar

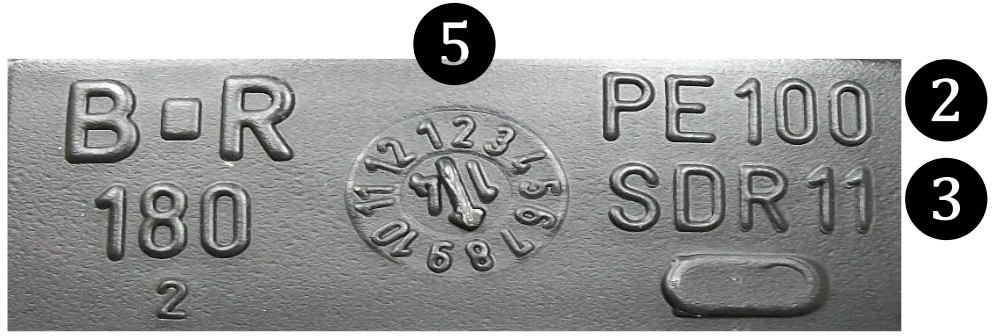
SDR 17 – Operating Pressure [bar]

Temp [°C]	Year of Operation				
	5	10	25	50	100
10	12,6	12,4	12,1	11,9	11,6
20	10,6	10,4	10,1	**10,0**	9,8
30	9,0	8,8	8,6	8,4	
40	7,7	7,6	7,4	7,2	
50	6,7	6,5	5,9		
60	4,8				

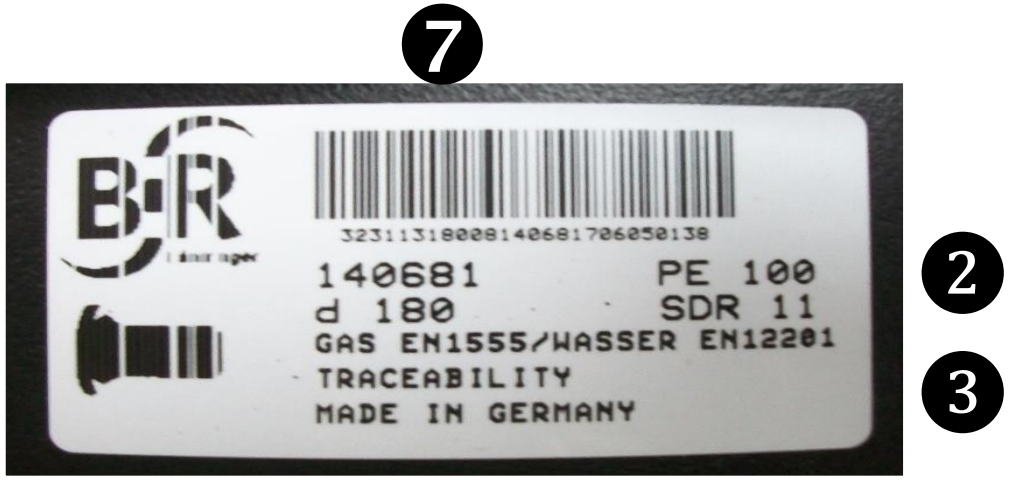
PE80 = 8bar

Bänninger PE Fittings - Labelling according to EN1555 (Gas) and EN12202 (Water)

Stamp



Label



1. Manufacturer
2. Material
3. Standard Dimension Ratio
4. Dimension
5. Date of Production (required for Internal Inspection Certificate)
6. Internal information only (not required)
7. Traceability

Injection Moulded Fittings

- Injection moulded fittings allow the full pressure of the pipes.
- No pressure loss for elbows of tees.
- No inner beads creating additional pressure loss. Bänninger fittings have very special inside and outside design with smooth transitions. Feel the difference!
- This smooth transitions with perfect rounding at the outside and inside are suitable for high flow rates and also very important to prevent cracks.





Fitting	De-rating Factor	SDR 17	SDR 11
Elbow 45°, 90°	1	10bar	16bar
Tee	1	10bar	16bar

Fittings welded from segmented pipes

- Fittings welded from segmented pipes have less pressure rates than injection moulded fittings.
- According to ISO 4427-3 the pressure is 20% less for welded elbows & bends and 50% less for welded tees.
- The weakest part determines the pressure level
- Inner beads create turbulences + pressure loss.







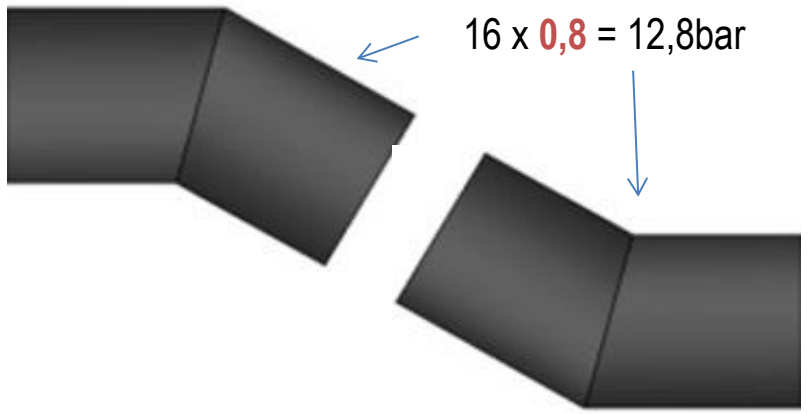


Fitting	Derating Factor	SDR 17	SDR 11
Elbow 45°, 90°	0,8	10 x 0,8 = **8bar**	16 x 0,8 = **12,8bar**
Tee	0,5	10 x 0,5 = **5bar**	16 x 0,5 = **8bar**

System Pressures (Segmented vs. Injection)

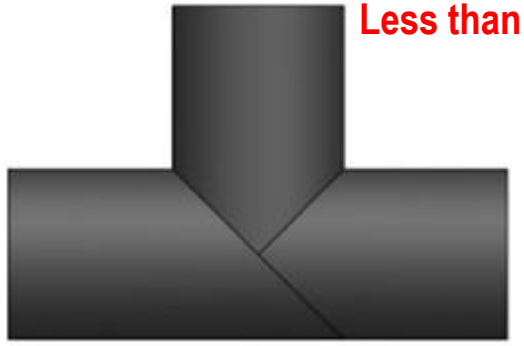
Pipe PE
SDR 11
16bar, 20°





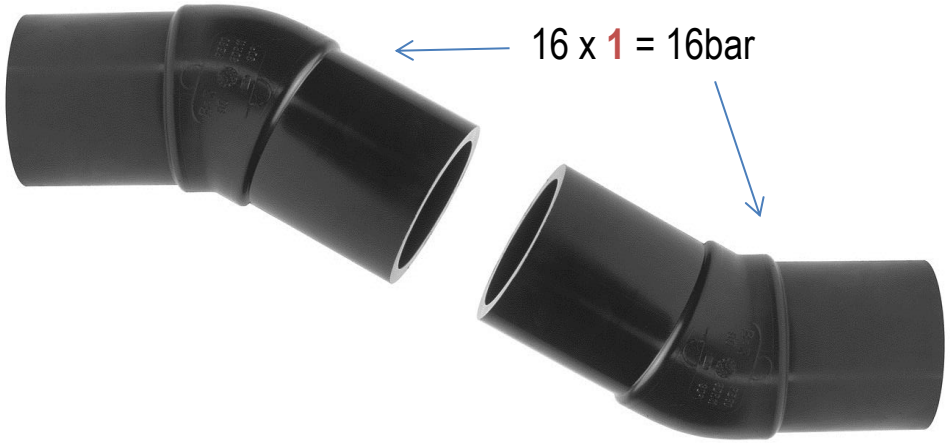
16 x **0,8** = 12,8bar

16 x **0,5** = **8bar**
Less than SDR 17!



Pipe PE
SDR 11
16bar, 20°





16 x **1** = 16bar

16 x **1** = **16bar**
Full pressure!



Segmented vs. Injection Moulded Fittings

Segmented

+ Easy and cheap in production
+ Weight of pipes
+ High availability in the market

- Inner beads and high pressure loss
- High risk regarding damages
--- Huge amount of pressure reduction





Injection moulded

- Complex and more expensive in production
- Higher weight than pipes
- Longer production time, less manufacturers

+ No additional inner beads and less pressure loss
+ No risks regarding damages
+++ No pressure reduction



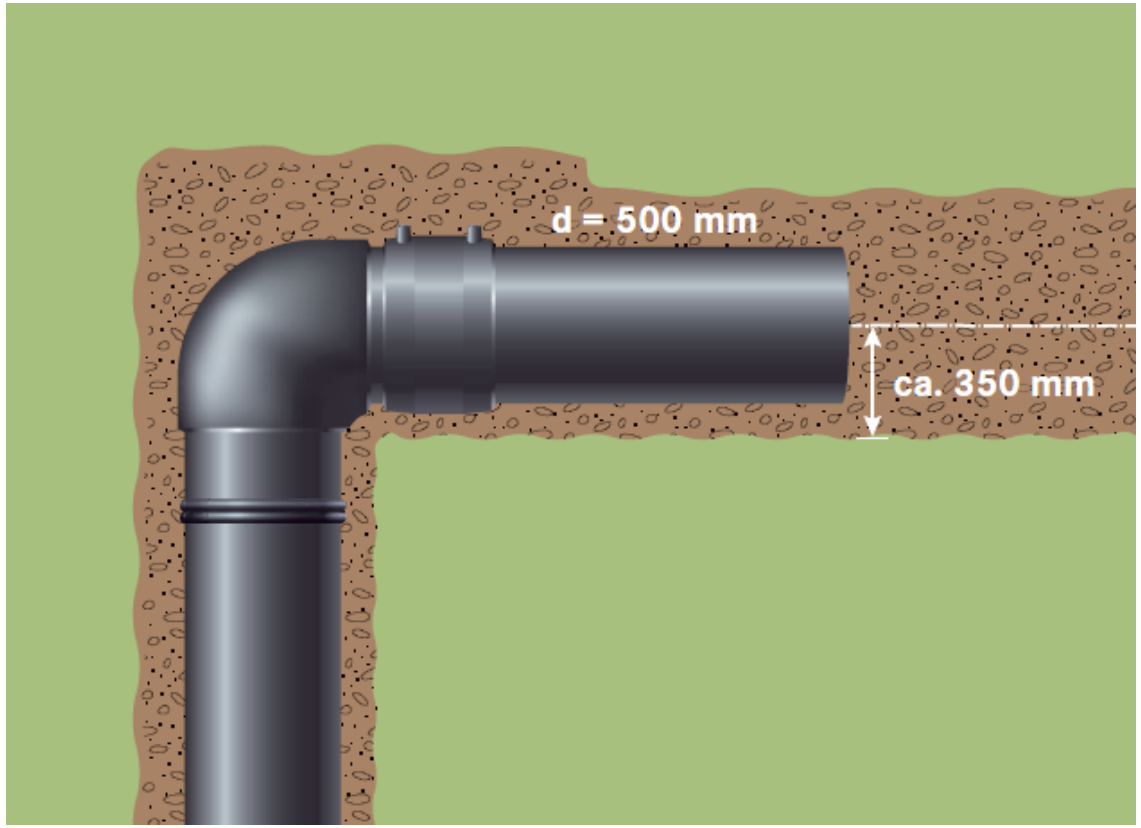


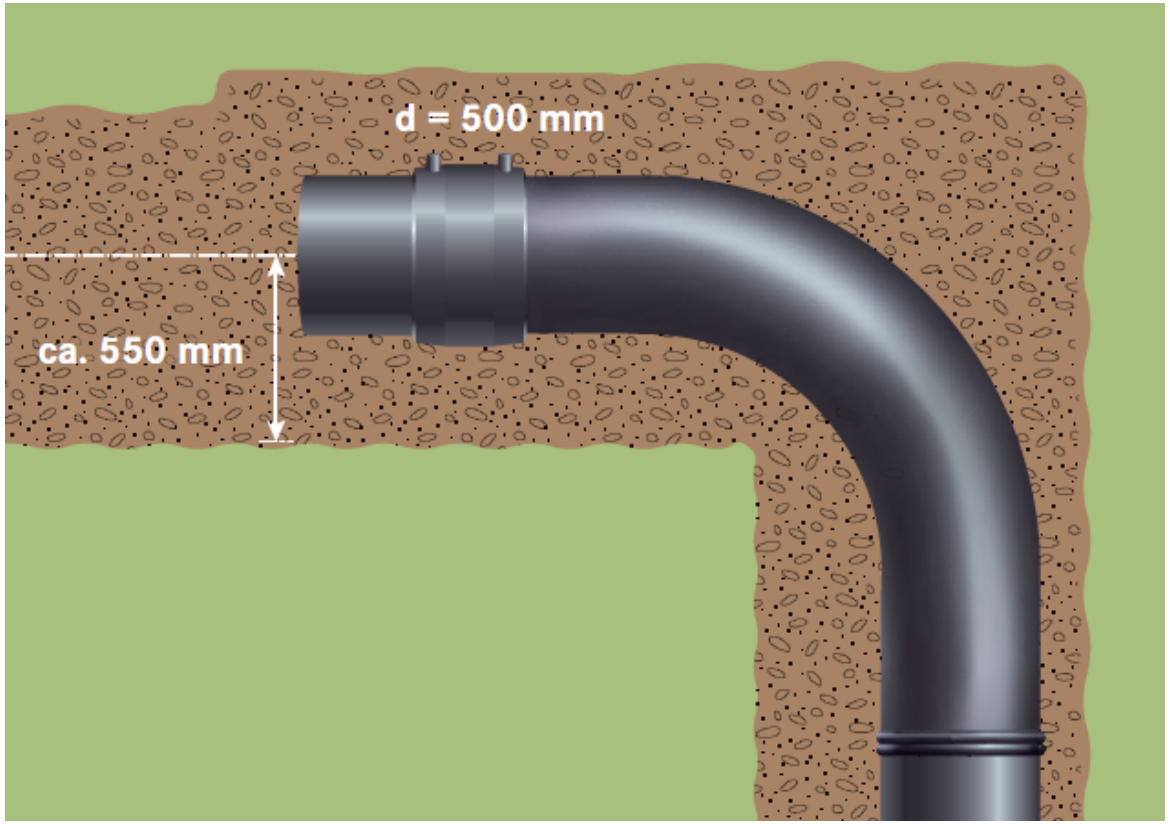
Elbow vs. Bend

- Injection moulded elbows are available with SDR11 and SDR17 and approved without any pressure-reducing factor
- Perfectly rounded surfaced for perfect installations
- Compact installation dimensions leading to less excavation space
- Rounded inner radius for no water turbulance
- Better and cheaper storage
- Cheaper transportation

- Injection moulded bends are available with SDR11 and SDR17 but depending on the method of manufacturing the pressure rating might be reduced
- Better flow behaviour for no turbulence - smooth
- Suitable for butt and electro fusion
- More flexible because of the length

Elbow vs Bend – less excavation space





Elbow vs. Bend - Easy Storage

Transport with standarized palets or boxes – no waste of transport volume in containers or on trucks



Transport need extra volume.
Not stackable.



Requirements

- EN 1555 plastic pipeline systems gas supply
  EN 12201 plastic pipeline systems for drinking water supply
- ISO 1183 Density ≥930kg/m³
- Melt Flow Index 0,3 – 0,5g/10min
- DIN 53752 Expansion 0,13mm/mk
- Black colour

- EN 1555 + EN 12201 Geometrical properties, labelling and pressures.

- Welding ability regarding DVS sheet 2207 part 1
- Resistance against chemicals DIN 8075
- DVGW approval according GW 335-B2

- PE100 = 10MPa at 0°C / 50year Lifetime
  Former materials PE63 and PE80 are not being used by Bänninger.



PAEW Tender Rustaq Water

Country: **Sultante of Oman**

Year: **2014**

Contractor: **Galfar Engineering & Contracting**

Stores: **-**

Consultant: **Public Authority for Electricity and Water**

Products: **PE100**

Water Distribution Network Rustaq
Dimensions from d90 to d355 SDR11
Amount in AED 470,000.00



FEWA Tender 53W2013

Country: **Dubai – United Arab Emirates**

Year: **2014**

Contractor: **Dutco Tennant LLC**

Stores: **-**

Consultant: **Federal Electricy and Water Authority**

Products: **PE100**

Dimensions from d90 to d200 SDR11
Water Distribution Network Sharjah
Amount in AED 520,000.00



Frankfurt Airport

Country: **Germany**

Year: **2013**

Contractor: **Rohrleitungsbau Fritz GmbH**

Stores: **-**

Consultant: **Fraport**

Products: **PE100**

PE100 fittings from drainage applications up to d710 DS



Standard System for chemical Applications





Chemical industrie



Industrie



Industrie



Water supply

PVC-U Pipes & Fittings

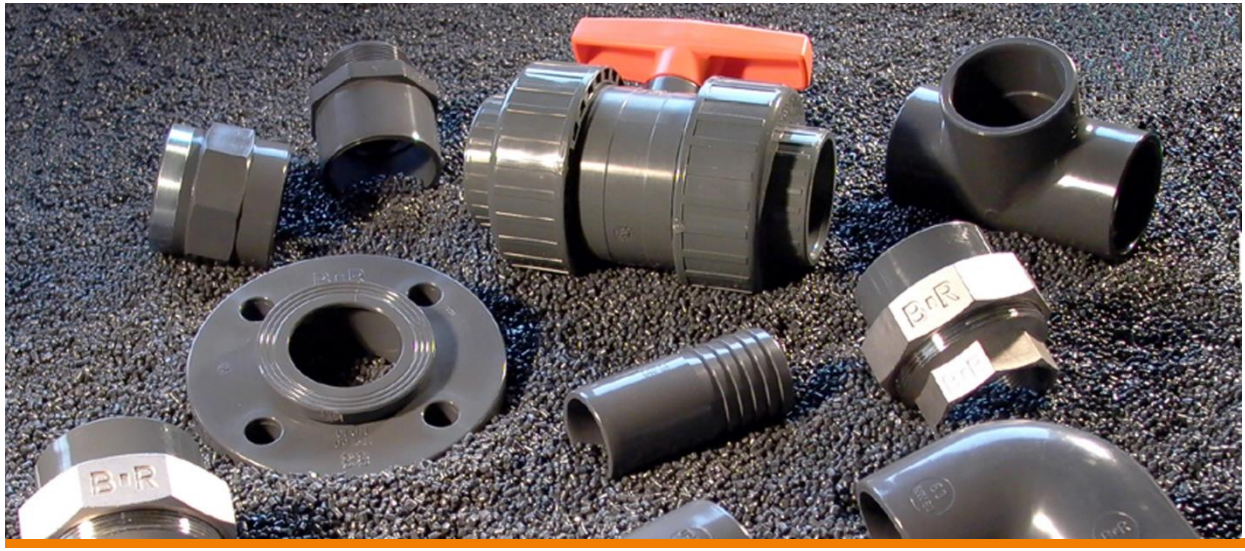
Material: PVC-U (PVC unplastified) Polyvinylchloride - PVC-U grey colour

Dimensions: from d8 up to d315

Working pressure: Pressure rate for adhesive and transition fittings
PN16 equal to 20°C up to 16bar

Pressure rate for transition and threaded fittings
PN16 equal to 20°C up to 10bar

- Sewage neutralization
- Chemical industry
- Fish industry
- Photo and film industry
- Swimming pools
- Waste water



PVC-U (*PVC-hard*) = *polyvinyl chloride*, Colour grey, complies with the standard for pressure lines made of PVC-hard. The material is in compliance with the recommendations of KTW, the German Federal Public Health Department (*BGA*). Baenninger PVC-U fittings are registered within DVGW, the German Technical and Scientific Association for Gas and Water for application in the area of water supply.

DVGW CERT

Made in Germany

Flanges suitable BR PVC-U piping systems

Flanges with PP coating, fiber glass with metal insert manufactured acc. to DIN EN 1092

Drilling and pressure rating

Flanges made of PVC-U

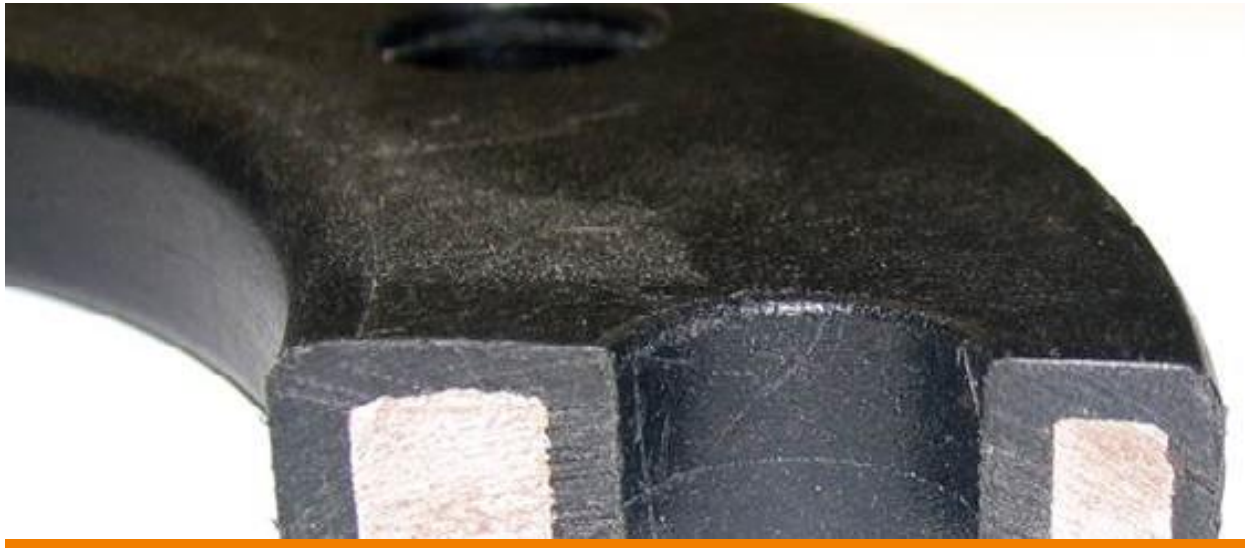
621.70.00 from d16 up to d160mm drilled/ resistant to PN16

621.70.00 from d225 up to d315mm drilled/ resistant to PN10

Steel flanges with PP coating

621.74.00 from d20 up to d160mm drilled/ resistant to PN16

621.74.00 from d225 are drilled/ resistant to PN10



Steel flange with PP coating

Made in Germany

Etihad Towers Abu Dhabi

Country: **Abu Dhabi - United Arab Emirates**

Year: **2006**

Contractor: **Voltas Limited**

Stores: **74**

Consultant:

Products: **PVC-U**

1. Tower **69 Floors** – 277m
2. Tower **74 Floors** – 305m
3. Tower **54 Floors** – 260m
4. Tower **60 Floors** – 234m
5. Tower **55 Floors** – 218m



Bänninger
Solution Provider



Solution Selling - Accessories



Solution Selling – Butt Welding Machines

One of our main purposes is to be at customers disposal, to support him in the best possible way, to him in the technology and assist him, allowing us to take part in his activities and being always available. For the future BR plans to expand their product range in addition to a continuous development of existing products in order to meet requirements of existing and potential customers.

Welding equipment in range:

- **Butt Welding machines**
- **Manual Welding machines**
- **Welding equipment**



Solution Selling – Mounting Materials

Bänninger presents patented and registered patterns in fixing technologies produced by a highly respected company.
This mounting materials are suitable for:

- Sanitary installations
- Heating installations
- Electrical Assemblies
- Solar installations
- Ventilation installations
- Building drainage installations



Made in Germany

Solution Selling - Consulting

We develop solutions together with our customers:

- **Finding the right material meeting the requirements**
- **Working on weak spots**
- **Inspection visits**
- **Support on site**
- **Compliance statements**
- **Support in approval processes**



Solution Selling – Training

- **Sales Coaching**
- **Technical Sales**
- **Specific Seminars**
- **Solution Development**



Solution Selling – Inspection

- **Site inspections**
- **Welding training**
- **Quick test for material quality**
- **Storage**



Thank you for your attention.