CERTIFIED
ISO 9001

Matherm

PP-R Pipes and Fittings

Miatherm

HAYKAL PLAST SAL
PLASTICS SOLUTIONS

Content

01 History

1993

Haykal Plast in its current form is founded by Antoine Haykal.

HAYKAL PLAST S.A.L. PLASTICS SOLUTIONS

1998

Launching of PVC rubber ring pipe segment.

2004

Launching of Mia Plast PVC fittings.

Miaplast

2005

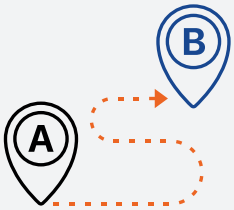
Becomes market leader in the local sector as the largest plastic pipe producer in Lebanon

2006

Received certification for ISO 9001

CERTIFIED ISO 9001

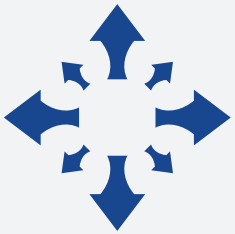
2008



Production and warehousing moved to a new location

2009 — Launched HDPE line of products

2011 — First product certification mark acquired



2019 — Factory expansion. New combined factory and warehouses exceeding 40,000 m^2

2020 — Lauch of VOLTAPIPE line of products

VOLTAPIPE

2023 — Haykal Plast celebrates 30 years in business

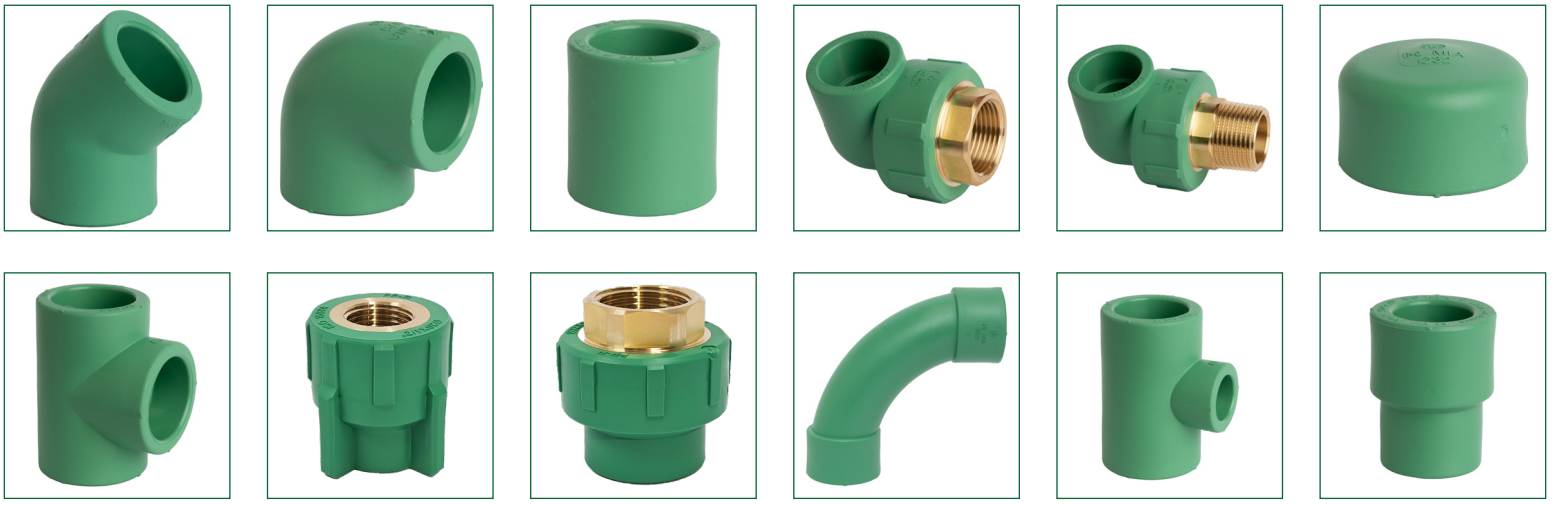
2024 — Launch of Miatherm PP-r products a new product focused on uncompromising superior quality.

Miatherm

02 Intro

Miatherm is a diverse line of PP-r pipe and fitting products aimed at the domestic and industrial sector.

Miatherm products are uncompromising in their quality being a perfect match for potable water distribution, cold and hot water lines, industrial cooling and heating, and chemical transfer.



Miatherm

The unique material used to produce **Miatherm** products with a greater strength (with an MRS of 11.2 MPa) exceeds the requirements set in the standards **EN 15874** and **DIN 8077/8078**.

With exceptional raw materials, purpose-built machinery, world class laboratory and expertise honed over 30 years in the production of market leading plastic products, **Miatherm** products are guaranteed to meet any requirements with ease.

03
Material Properties

PP-R (Polypropylene Random Copolymer)

PP-R (Polypropylene Random Copolymer) is a highly durable thermoplastic that boasts high temperature resistance, making it suitable for both hot and cold water applications, while its chemical resistance ensures it remains unaffected by acids, bases, and other industrial chemicals.

With a smooth inner surface that minimizes friction loss and prevents scale buildup, PP-R piping maintains efficiency over its lifetime.

Additionally, a long service life, often exceeding 50 years with proper installation, environmental friendliness and full recyclability, PP-R is a sustainable choice for modern plumbing.

Its lightweight nature simplifies handling and installation, and its leak-proof joints—achieved through heat fusion—enhance reliability.

Unlike metal pipes, PP-R is corrosion-resistant, eliminating concerns about rust or degradation. PP-R is safe for potable water for human consumption with no effect on taste.

Property	Typical Value	Test Method
Density	905kg/m³	ISO 1183
Melt Flow Rate (230°C/2.16kg)	0.26g/10min	ISO 1133
Flexural Modulus (2mm/min)	850MPa	ISO 178
Tensile Modulus (1mm/min)	800MPa	ISO 527
Tensile Strain at Yield (50mm/min)	13.5%	ISO 527-2
Tensile Stress at Yield (50mm/min)	25MPa	ISO 527-2
Elongation at Break	> 50%	
Thermal Conductivity	0.24W/(m K)	DIN 52612
Coefficient of Thermal Expansion (0°C/70°C)	1.5*10-4/K	DIN 53752
Charpy Impact Strength, notched (23°C)	60 kJ/m²	ISO 179/1eA
Charpy Impact Strength, notched (0°C)	6.0kJ/m²	ISO 179/1eA
Charpy Impact Strength, unnotched (23°C)	No break	ISO 179/1eU
Charpy Impact Strength, unnotched (0°C)	No break	ISO 179/1eU
Specific Heat at 20°C	2.0 kJ/kg K	Adiabatic Calorimeter
Pipe Friction Factor	0.007	

04
Advantages of Miatherm PP-R System

RAISING THE BAR, AND HEAT!

Made from the highest quality materials
with MRS > 11.2 MPa, exceeding the curve of PP-RCT.

Reliable longevity
exceeding 50 years, backed by ISO 15874 testing

Stabilized to prevent the polymer from oxidizing
which can occur after prolonged exposure to high temperatures above 70°C and intense pressure.

Resistant to contact corrosion
even when exposed to iron particles.

Excellent chemical resistance
ensuring stability across various applications.

Minimal incrustation
maintaining long-term efficiency.

Bacteriologically neutral
promoting hygiene and safety.

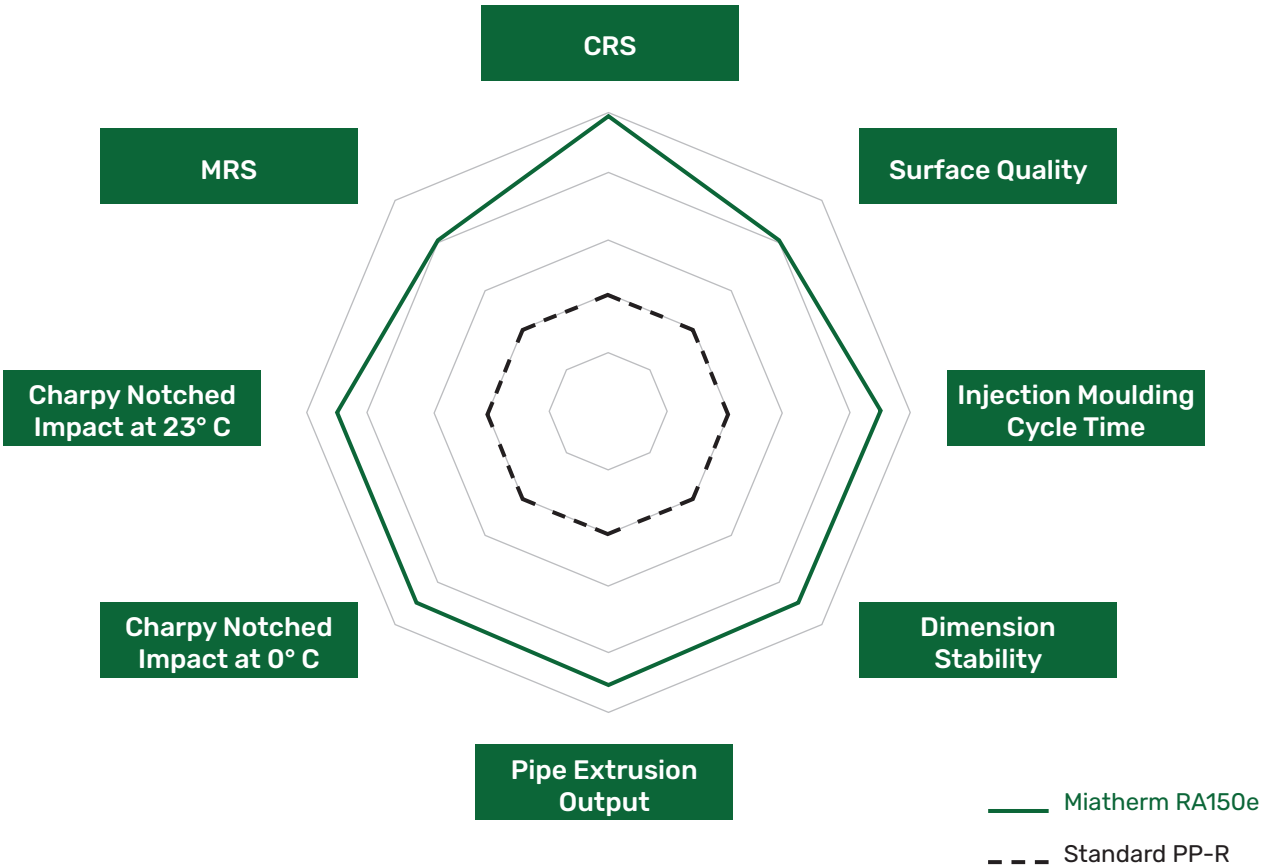
Taste and odor neutrality
preserving water purity.

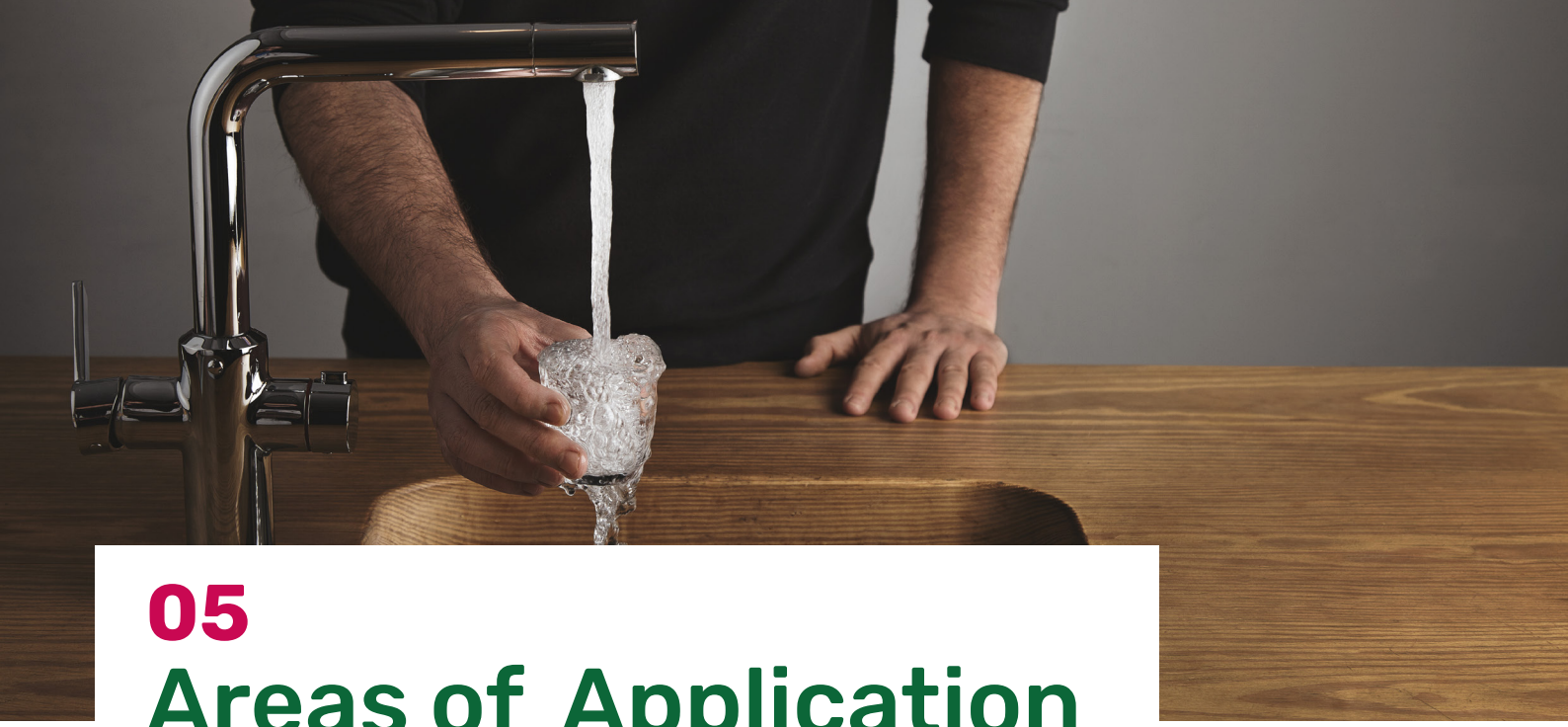
Brass components made of the highest quality
CW617N material to ensure suitability for contact with potable water.

Zero leak system
due to heat welding.

Streamlined installation
designed for speed and ease.

Complete plastic system availability
for seamless integration.





05
Areas of Application

1

Plumbing & Water Supply

Hot and cold water distribution in residential, commercial, and industrial buildings.

Drinking water systems.

Underfloor heating systems.

2

HVAC & Cooling Systems

Hydraulic distribution for radiators, convectors, and fan coil units.

Cooling water and condensate water.

3

Compressed air systems

4

Industrial Applications

Chemical transport pipelines.

Process pipelines in manufacturing plants.

5

Agriculture & Irrigation

Water distribution for irrigation systems.

Greenhouse climate control systems.

Application Classes

Miatherm PP-R pipes are produced in full conformance with the European standards DIN 8077/8078 and ISO 15874 which specifies the requirements of pipes made from polypropylene (PP) for piping systems intended to be used for hot and cold water installations within buildings for the conveyance of water whether or not intended for human consumption (domestic systems) and for heating systems under operating pressures and temperatures appropriate to the class of application.

Miatherm Fiber pipes additionally comply with ISO 21003 which is the standard for multilayer piping systems for hot and cold water installations inside a building.

06
Miatherm Pipes

Miatherm pipes are available for all purposes, whether it be cold and hot water transportation, hot water radiators or installations exposed to UV light.

The range of pipes produced by Miatherm are listed in the table below.

		Available Range (ISO 15874, DIN 8077/78)								
	SDR	20	25	32	40	50	63	75	90	110
Miatherm	PP-R	6	S	S	S	S	S	S	R	R	R
	PP-R	7.4	S	S	S	S	S	S	R	R	R
	PP-RCT	7.4	S	S	S	S	S	S	R	R	R
	Fiber	6	S	S	S	S	S	S	R	R	R
	AquaGuard UV Fiber	6	S	S	S	S	S	S	N/A	N/A	N/A

Other dimensions (up to 160mm) and pipes with special requirements can be produced. Contact Miatherm for more information

S: Standard
R: Upon Request
N/A: Not Available

Technical Data

		Miatherm Single Layer			Miatherm Multilayer	
Type		PP-R SDR 6	PP-R SDR 7.4	PP-RCT SDR 7.4	Fiber	AquaGuard UV Fiber
						
Pipe Series		SDR 6/S 2.5	SDR 7.4/S 3.2	SDR 7.4/S 3.2	SDR 6/S 2.5	SDR 6/S 2.5
Range		20-63 (up to 160 on request)	20-63 (up to 160 on request)	20-110 (up to 160 on request)	20-63	20-63
Standards		ISO 15874, DIN 8077/78			ISO 15874, DIN 8077/78, ISO 21003	
Working Pressure as per DIN 8077 (SF=1.5)	20°C	25.7 bar	20.4 bar	24.3 bar	25.7 bar	25.7 bar
	70°C	8.5 bar	6.7 bar	10.7 bar	8.5 bar	8.5 bar
Working Pressure as per class as per ISO 15874	Class 1	10 bar	8 bar	10 bar	10 bar	10 bar
	Class 2	8 bar	6 bar	10 bar	8 bar	8 bar
	Class 3	10 bar	10 bar	10 bar	10 bar	10 bar
	Class 4	6 bar	6 bar	8 bar	6 bar	6 bar
Coefficient of linear expansion α		0.15 mm/mK	0,15 mm/mK	0,15 mm/mK	0,035 mm/mK	0,035 mm/mK
Fire Classification		DIN 4102: B2 EN 13501: E				

Miatherm Fiber Pipe

System Advantages

PP-R pipes undergo significant linear expansion at raised temperatures. This must be taken into account for long pipe lengths by using appropriate expansion loops and fixtures as the expansion can become significant and will cause undue stress on the pipe.

Miatherm fiber pipes provide and alternate solution by having a 75% lower linear thermal expansion compared to single layer PP-R pipes. A glass-fiber reinforced middle layer reduces the linear thermal expansion to 0.035 mm/mK (from 0.15 mm/mK for normal pipes). This also equates to less fastening points needed, with a longer distance between pipe clamps required versus non-fiber pipes.

A demonstration of this phenomenon is given in the example below:

Installed pipe length:
15 meters

Operating Temperature:
70°C

Difference between 20°C and 70°C:
ΔT (K) = 50

$$\Delta L = \alpha \times L \times \Delta T$$

	α (mm/m·K)	Length L (m)	ΔT (K)	Expansion ΔL (mm)
Standard Single Layer PP-R	0.15	15	50	112.5
Miatherm Fiber Pipe	0.035	15	50	26.25

As can be seen from this example, a normal PP-R pipe will expand by more than 11cm over this length! Conversely, a Miatherm Fiber pipe would only expand by 2.6cm over the same length making for a much simpler, safer and visually appealing installation.

The thermal expansion of a pipe

Miatherm PP-R Pipe										
Pipe Length (L in m)	Temperature Difference in K (Δ)									
	10	20	30	40	50	60	70	80	90	100
0.1	0.15	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50
0.2	0.30	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00
0.3	0.45	0.90	1.35	1.80	2.25	2.70	3.15	3.60	4.05	4.50
0.4	0.60	1.20	1.80	2.40	3.00	3.60	4.20	4.80	5.40	6.00
0.5	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50
0.6	0.90	1.80	2.70	3.60	4.50	5.40	6.30	7.20	8.10	9.00
0.7	1.05	2.10	3.15	4.20	5.25	6.30	7.35	8.40	9.45	10.50
0.8	1.20	2.40	3.60	4.80	6.00	7.20	8.40	9.60	10.80	12.00
0.9	1.35	2.70	4.05	5.40	6.75	8.10	9.45	10.80	12.15	13.50
1.0	1.50	3.00	4.50	6.00	7.50	9.00	10.50	12.00	13.50	15.00
2.0	3.00	6.00	9.00	12.00	15.00	18.00	21.00	24.00	27.00	30.00
3.0	4.50	9.00	13.50	18.00	22.50	27.00	31.50	36.00	40.50	45.00
4.0	6.00	12.00	18.00	24.00	30.00	36.00	42.00	48.00	54.00	60.00
5.0	7.50	15.00	22.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00
6.0	9.00	18.00	27.00	36.00	45.00	54.00	63.00	72.00	81.00	90.00
7.0	10.50	21.00	31.50	42.00	52.50	63.00	73.50	84.00	94.50	105.00
8.0	12.00	24.00	36.00	48.00	60.00	72.00	84.00	96.00	108.00	120.00
9.0	13.50	27.00	40.50	54.00	67.50	81.00	94.50	108.00	121.50	135.00
10.0	15.00	30.00	45.00	60.00	75.00	90.00	105.00	120.00	135.00	150.00

$\Delta L = 0.15 \times L \times \Delta T$

can be seen in the 2 tables below

Miatherm Fiber Multilayer PP-R Pipe										
Pipe Length (L in m)	Temperature Difference in K (Δ)									
	10	20	30	40	50	60	70	80	90	100
0.1	0.04	0.07	0.11	0.14	0.18	0.21	0.25	0.28	0.32	0.35
0.2	0.07	0.14	0.21	0.28	0.35	0.42	0.49	0.56	0.63	0.70
0.3	0.11	0.21	0.32	0.42	0.53	0.63	0.74	0.84	0.95	1.05
0.4	0.14	0.28	0.42	0.56	0.70	0.84	0.98	1.12	1.26	1.40
0.5	0.18	0.35	0.53	0.70	0.88	1.05	1.23	1.40	1.58	1.75
0.6	0.21	0.42	0.63	0.84	1.05	1.26	1.47	1.68	1.89	2.10
0.7	0.25	0.49	0.74	0.98	1.23	1.47	1.72	1.96	2.21	2.45
0.8	0.28	0.56	0.84	1.12	1.40	1.68	1.96	2.24	2.52	2.80
0.9	0.32	0.63	0.95	1.26	1.58	1.89	2.21	2.52	2.84	3.15
1.0	0.35	0.70	1.05	1.40	1.75	2.10	2.45	2.80	3.15	3.50
2.0	0.70	1.40	2.10	2.80	3.50	4.20	4.90	5.60	6.30	7.00
3.0	1.05	2.10	3.15	4.20	5.25	6.30	7.35	8.40	9.45	10.50
4.0	1.40	2.80	4.20	5.60	7.00	8.40	9.80	11.20	12.60	14.00
5.0	1.75	3.50	5.25	7.00	8.75	10.50	12.25	14.00	15.75	17.50
6.0	2.10	4.20	6.30	8.40	10.50	12.60	14.70	16.80	18.90	21.00
7.0	2.45	4.90	7.35	9.80	12.25	14.70	17.15	19.60	22.05	24.50
8.0	2.80	5.60	8.40	11.20	14.00	16.80	19.60	22.40	25.20	28.00
9.0	3.15	6.30	9.45	12.60	15.75	18.90	22.05	25.20	28.35	31.50
10.0	3.50	7.00	10.50	14.00	17.50	21.00	24.50	28.00	31.50	35.00

$$\Delta L = 0.035 \times L \times \Delta T$$

Temperature °C	Years of Service	Pipe series S									
		20	16	12.5	8.3	8	5	4	3.2	2.5	2
		Standard dimension ration SDR									
		41	33	26	17.6	17	11	9	7.4	6	5
		Allowable operating pressure (bar)									
10	1	4.4	5.5	7.0	10.5	11.1	17.5	22.1	27.8	35.1	44.1
	5	4.1	5.2	6.6	9.9	10.4	16.5	20.8	26.2	33.0	41.6
	10	4.0	5.1	6.4	9.7	10.1	16.1	20.3	25.6	32.2	40.5
	25	3.9	4.9	6.2	9.3	9.8	15.6	19.6	24.7	31.1	39.2
	50	3.8	4.8	6.0	9.1	9.6	15.2	19.1	24.1	30.3	38.2
	100	3.7	4.6	5.9	8.9	9.3	14.8	18.6	23.5	29.6	37.2
20	1	3.7	4.7	5.9	9.0	9.4	15.0	18.8	23.7	29.9	37.7
	5	3.5	4.4	5.6	8.4	8.9	14.1	17.7	22.3	28.1	35.4
	10	3.4	4.3	5.4	8.2	8.6	13.7	17.2	21.7	27.4	34.5
	25	3.3	4.1	5.2	7.9	8.3	13.2	16.6	21.0	26.4	33.3
	50	3.2	4.0	5.1	7.7	8.1	12.9	16.2	20.4	25.7	32.4
	100	3.1	3.9	5.0	7.5	7.9	12.5	15.8	19.9	25.0	31.5
30	1	3.2	4.0	5.0	7.6	8.0	12.7	16.0	20.2	25.4	32.0
	5	3.0	3.7	4.7	7.2	7.5	11.9	15.0	18.9	23.8	30.0
	10	2.9	3.6	4.6	7.0	7.3	11.6	14.6	18.4	23.2	29.2
	25	2.8	3.5	4.4	6.7	7.0	11.2	14.1	17.7	22.3	28.1
	50	2.7	3.4	4.3	6.5	6.8	10.9	13.7	17.2	21.7	27.4
	100	2.6	3.3	4.2	6.3	6.6	10.6	13.3	16.8	21.1	26.6
40	1	2.7	3.4	4.3	6.5	6.8	10.8	13.6	17.1	21.6	27.2
	5	2.5	3.2	4.0	6.0	6.3	10.1	12.7	16.0	20.2	25.4
	10	2.4	3.1	3.9	5.9	6.2	9.8	12.3	15.5	19.6	24.7
	25	2.3	2.9	3.7	5.6	5.9	9.4	11.9	15.0	18.8	23.7
	50	2.3	2.9	3.6	5.5	5.8	9.2	11.5	14.5	18.3	23.1
	100	2.2	2.8	3.5	5.3	5.6	8.9	11.2	14.1	17.8	22.4
50	1	2.3	2.8	3.6	5.5	5.7	9.1	11.5	15.1	18.2	23.0
	5	2.1	2.7	3.4	5.1	5.3	8.5	10.7	13.5	17.0	21.4
	10	2.0	2.6	3.3	4.9	5.2	8.2	10.4	13.1	16.5	20.8
	25	2.0	2.5	3.1	4.7	5.0	7.9	10.0	12.6	15.9	20.0
	50	1.9	2.4	3.0	4.6	4.8	7.7	9.7	12.2	15.4	19.4
	100	1.8	2.3	2.9	4.5	4.7	7.5	9.4	11.8	14.9	18.8

Table 1: Operating Pressure for PP-R pipes according to DIN 8077

07
Application Classes for Miatherm Pipes

What are Application Classes (ISO 15874)?

Each class represents a **typical use case** (environment where the pipe is installed) with specific temperature and pressure limits (4,6,8 or 10 bar). Think of them as categories that help installers and engineers pick the right pipe for the right environment.

Application Class	Typical field of application
Class 1	Hot water supply (60 °C)
Class 2	Hot water supply (70 °C)
Class 4	Underfloor heating and low temperature radiators
Class 5	High temperature radiators

Is there such a thing as Class 1 or Class 5 pipe?

No. Pipes can be applied/used in any class range (with the exception of thin pipes such as SDR11 – PN10). The difference between the application classes will be the allowable operating pressure under different temperature. These operating parameters are specified in ISO 15874 (parts 1 and 2) shown in tables 2, 3 and 4 below.

Example

- **A PP-R pipe 20x3.4mm used in a Class 2 area (hot water supply at 70 °C) can be operated at 8 bar for 50 years.**
- **The same pipe used in an application area Class 5 (high temperature radiators up to 90°C) will have an operating pressure of 6 bar.**

In short, this **20x3.4mm PP-R pipe** can be applied to these environments under the following conditions:

Application Class	Allowable pressure at rated temperature
Class 1	10 bar
Class 2	8 bar
Class 4	10 bar
Class 5	6 bar

How to choose which pipe is suitable for your system?

Choose the pipe based on the environment where it will be installed and the required operating pressure. From this information you can get the required wall thickness of the pipe to be installed (series of pipe).

The series (which relates to the pipe wall thickness) is chosen from tables 3 (PP-R) and 4 (PP-RCT) of **ISO 15874-2**.

Application Class	Design Temperature, T_D	Time [2] at T_D	T_{max}	Time at T_{max}	T_{mal}	Time at T_{mal}	Typical field of application
	°C	years	°C	years	°C	h	
1 [1]	60	49	80	1	95	100	Hot water supply (60°C)
2 [1]	70	49	80	1	95	100	Hot water supply (70°C)
4 [2]	20	2.5	70	2.5	100	100	Underfloor heating and low temperature radiators
	Followed by						
	40	20					
	Followed by						
	60	25					
	Followed by (see next column)		Followed by (see next column)				
5 [2]	20	14	90	1	100	100	High temperature radiators
	Followed by						
	60	25					
	Followed by						
	80	10					
	Followed by (see next column)		Followed by (see next column)				

1) A country may select either class 1 or class 2 to conform to its national regulations.
2) Where more than one design temperature appears for any class, the times should be aggregated (e.g. the design temperature profile for 50 years for class 5 is 20°C for 14 years followed by 60°C for 25 years, 80°C for 10 years, 90°C for 1 year and 100°C for 100h).

NOTE: For values of T_D, T_{max} and T_{mal} in excess of those in this table, this standard does not apply.

Table 2: Application Classes as per ISO 15874-1

^{P}D	Application			
	Class 1	Class 2	Class 4	Class 5
bar	$S_{calc,max}$ = values [a]			
4	6.9	5.3	6.9	4.7
6	5.0	3.5	5.5	3.2
8	3.8	2.6	4.1	2.4
10	3.0	2.1	3.3	1.9

[a] The values are rounded to the first place of decimals.

Table 3: $S_{calc,max}$ = values for PP-R

^{P}D	Application			
	Class 1	Class 2	Class 4	Class 5
bar	$S_{calc,max}$ = values [a]			
4	8.2	8.2	8.2	7.3
6	6.1	5.7	6.1	4.9
8	4.5	4.3	4.6	3.7
10	3.6	3.4	3.7	2.9

[a] The values are rounded to the first place of decimals.

Table 4: $S_{calc,max}$ = values for PP-RCT

EXAMPLE

Miatherm PP-R pipe 20*4.2 SDR6

DIN 8077

This pipe with an SDR6 can be operated for a period of 50 years at an operating pressure of 25.7 bar.

ISO 15874

Selecting Application Class 2 (i.e.: Hot Water Supply at 70°C), this pipe can be operated at 70°C for 49 years and 1 year at a T_{max} = 80°C. The pressure is provided by Table 3 in ISO 15874-2. For this case it is 6 bar.

Choosing Application Class 5 (i.e.: High Temperature Radiators), the pipe can be operated for 14 years at 20°C, followed by 25 years at 60°C and 10 years at 80°C.

T_{max} = 90°C for a total of 1 year. A malfunction temperature of 100°C is allowable for a total of 100 hours. Notice that the operating life sums up to 50 years.

Miatherm AquaGuard UV Fiber Pipe

System Advantages

PP-R pipes are susceptible to UV-induced degradation. Unprotected pipes must not be installed in direct sunlight. To make outdoor installation simpler and more convenient, Miatherm provides a range of UV stabilized pipes intended for external installation exposed to UV light.

In addition to a middle layer of fiber-glass reinforced PP, Miatherm AquaGuard UV Fiber pipes are coated with a UV resistant external layer of a specially formulated PP. This makes the pipe resistant to UV exposure. No peeling is necessary before socket fusion making for a very fast and simple installation.

Miatherm AquaGuard UV Fiber pipes are available in the range of 20-63mm in SDR 6 (other dimensions can be accommodated).

Miatherm PP-RCT Pipe

System Advantages

PP-RCT is a polypropylene random copolymer engineered with a modified crystalline structure to withstand higher operating temperatures. It represents an evolution of the well-established PP-R material, offering enhanced performance under heat.

The increased crystallinity of PP-RCT leads to superior time-dependent creep resistance when the pipe is under internal compression at elevated temperatures. As a result, manufacturers can produce pipes with thinner walls without sacrificing strength, which in turn yields a larger effective inner diameter.

This larger bore delivers higher hydraulic capacity, an important benefit for systems that must move substantial volumes of water—such as those found in high-rise buildings. Plumbers and system designers gain from both the material's long-term stability and the efficiency advantages of its increased flow rate.

In short, PP-RCT provides the same pressure rating for a lower wall thickness, i.e more water flow.

Pipe Type	SDR	Outer Ø (mm)	Wall Thickness (mm)	Inner Ø (mm)	Flow at 1.5 m/s (m³/h)
PP-R (PN20)	6	32	5.4	21.2	1.91
PP-RCT (PN20)	7.4	32	4.4	27.6	2.28

For the case of a 32mm pipe, the PP-RCT pipe would provide 19% more water flow.

Markings

Miatherm pipes are marked at 1-meter intervals as per the requirements of section 10.2 of ISO 15874-2 (Table 12).

Aspect	Marking
Brand Name	Miatherm
Material	PP-R
SDR wall thickness ratio	SDR 6
Working Pressure @20°C (DIN 8077/78)	PN 20
Outer diameter × Wall Thickness	32 x 5.4mm
Dimensional class	A
Product Standards	ISO 15874, DIN 8077/8078
Class of application and admissible operational pressure according to EN ISO 15874	Class 1/10 bar, Class 2/8 bar, Class 4/10 bar, Class 5/6 bar
Production Line	PL2
Batch Number	BP1008
Date and Time	dd.mm.yy HH:MM

Miatherm PP-R pipe SDR 6/ S 2.5 (PN20)

DIN 8077/8078: 20°C 50 years=20 bar ISO 15874: Class 1=10 bar Class 2=8 bar Class 4=10 bar Class 5=6 bar

Code	Outer Ø (mm)	DN	Wall Thickness (mm)	Inner Ø (mm)	Water Content (l/m)	Weight (kg/m)	Packing
MTP120010000	20	12	3.4	13.2	0.137	0.172	30 pipes/120m
MTP125010000	25	15	4.2	16.6	0.216	0.266	25 pipes/100m
MTP132010000	32	20	5.4	21.2	0.353	0.434	15 pipes/60m
MTP140010000	40	25	6.7	26.6	0.556	0.671	10 pipes/40m
MTP150010000	50	32	8.3	33.4	0.866	1.040	7 pipes/28m
MTP163010000	63	40	10.5	42.9	1.385	1.650	

Available Colors: Green, White (replace with MTP2). Black and blue on request

Miatherm PP-R pipe SDR 7.4/ S 3.2 (PN16)

DIN 8077/8078: 20°C 50 years=16 bar ISO 15874: Class 1=8 bar Class 2=6 bar Class 4=10 bar Class 5=6 bar

Code	Outer Ø (mm)	DN	Wall Thickness (mm)	Inner Ø (mm)	Water Content (l/m)	Weight (kg/m)	Packing
MTP120030000	20	15	2.8	14.4	0.163	0.149	30 pipes/120m
MTP125030000	25	20	3.5	18.0	0.254	0.236	25 pipes/100m
MTP132030000	32	25	4.4	23.2	0.423	0.385	15 pipes/60m
MTP140030000	40	32	5.5	29.0	0.661	0.584	10 pipes/40m
MTP150030000	50	40	6.9	36.2	1.029	0.916	7 pipes/28m
MTP163030000	63	50	8.6	45.8	1.647	1.474	

Available Colors: Green, White (replace with MTP2). Black and blue on request

Miatherm PP-RCT pipe SDR 7.4/S 3.2 (PN24)

DIN 8077/8078: 20°C 50 years=25 bar ISO 15874: Class 1=10 bar Class 2=10 bar Class 4=10 bar Class 5=8 bar

Code	Outer Ø (mm)	DN	Wall Thickness (mm)	Inner Ø (mm)	Water Content (l/m)	Weight (kg/m)	Packing
MTR120020000	20	15	2.8	14.4	0.163	0.149	30 pipes/120m
MTR125020000	25	20	3.5	18.0	0.254	0.236	25 pipes/100m
MTR132020000	32	25	4.4	23.2	0.423	0.385	15 pipes/60m
MTR140020000	40	32	5.5	29.0	0.661	0.584	10 pipes/40m
MTR150020000	50	40	6.9	36.2	1.029	0916	7 pipes/28m
MTR163020000	63	50	8.6	45.8	1.647	1.474	

Miatherm Multilayer Fiber Reinforced PP-R pipe SDR 6/S 2.5 (PN25)

DIN 8077/8078: 20°C 50 years=25 bar ISO 15874: Class 1=10 bar Class 2=8 bar Class 4=10 bar Class 5=6 bar

Code	Outer Ø (mm)	DN	Wall Thickness (mm)	Inner Ø (mm)	Water Content (l/m)	Weight (kg/m)	Packing
MTP12002F000	20	12	3.4	13.2	0.137	0.172	30 pipes/120m
MTP12502F000	25	15	4.2	16.6	0.216	0.266	25 pipes/100m
MTP13202F000	32	20	5.4	21.2	0.353	0.434	15 pipes/60m
MTP14002F000	40	25	6.7	26.6	0.556	0.671	10 pipes/40m
MTP15002F000	50	32	8.3	33.4	0.866	1.040	7 pipes/28m
MTP16302F000	63	40	10.5	42.9	1.385	1.650	

Available Colors: Green, White (replace with MTP2). Black and blue on request

Miatherm Multilayer AquaGuard UV Fiber Reinforced PP-R pipe SDR 6/S 2.5 (PN25)

DIN 8077/8078: 20°C 50 years=25 bar ISO 15874: Class 1=10 bar Class 2=8 bar Class 4=10 bar Class 5=6 bar

Code	Outer Ø (mm)	DN	Wall Thickness (mm)	Inner Ø (mm)	Water Content (l/m)	Weight (kg/m)	Packing
MTP42002UF00	20	12	3.4	13.2	0.137	0.172	30 pipes/120m
MTP42502UF00	25	15	4.2	16.6	0.216	0.266	25 pipes/100m
MTP43202UF00	32	20	5.4	21.2	0.353	0.434	15 pipes/60m
MTP44002UF00	40	25	6.7	26.6	0.556	0.671	10 pipes/40m
MTP45002UF00	50	32	8.3	33.4	0.866	1.040	7 pipes/28m
MTP46302UF00	63	40	10.5	42.9	1.385	1.650	

Available Colors: Black (UV Protective HDPE layer)

Pipe Testing Plan

Miatherm products are manufactured under a stringent quality management system and are subject to comprehensive testing protocols in accordance with the requirements of ISO 15874 and DIN 8077/8078 international standards. Every production batch undergoes formal batch release testing prior to leaving the factory to ensure full compliance with dimensional accuracy, mechanical performance, and material integrity criteria.

For every pipe produced, complete quality control records and testing documentation are maintained and archived, providing full product traceability from raw material selection through to final inspection. This rigorous approach not only safeguards performance and durability but also offers clients the assurance that each product meets the highest industry benchmarks, delivering reliability and peace of mind throughout its service life.

Property	Initial Type Test	Frequency	Standard / Test Method
Melt Flow Index (MFR) 190 °C / 5 kg	-	Every Batch	ISO 1133
Delivery	X	Every Pipe	DIN 8078
Surface	X	Continuous	DIN 8078
Sizes and Tolerances	X	Continuous	DIN 8077 / DIN 8078 / ISO 15874
Change After Heat Treatment	X	Three times per week	DIN 8078
Melt Flow Index (Pipe)	X	Once per week + every batch	ISO 1133
Impact Flexural Test	X	Daily + every batch	DIN 8078
Internal Pressure Test (Hydrostatic)	X	Once per week + every batch	DIN 8078
Homogeneity of Material	X	Monthly	Microscope (max 0.02 mm)

Miatherm

08
Miatherm Fittings

Miatherm Fittings

Miatherm fittings are manufactured using the same high-quality raw material as Miatherm pipes, ensuring optimal compatibility and seamless welding throughout the system. Both components fully comply with the ISO 15874 standard, guaranteeing reliability and performance in accordance with international specifications. A complete range of fittings is available to suit any system, in addition to transition fittings between PP-R and metal or other plastic material. Miatherm offers a comprehensive product range, including but not limited to:

Standard Fittings

Couplers

Elbows

Tees

Reducers

End Caps

Long Bend

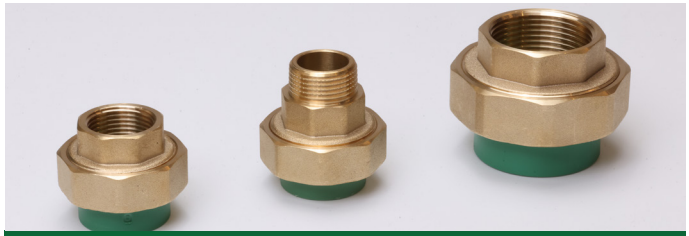
Transition Fittings

Female and Male Threaded Adapters

Female and Male Elbow Threaded Adapters

Brass Fittings

Nuts



Unions

Fixation Fittings

Clamps

Valves

All kinds of valves

System Advantages

- Complete range of fittings to complement any project. One manufacturer for all system components.
- Leak proof connections: fittings are made from the same high-quality material as the pipe ensuring a uniform system
- Low Thermal Conductivity: Reduces heat loss in hot water systems, improving energy efficiency and lowering operational costs.
- Long Service Life: Designed for decades of reliable performance
- Scale-Free Interior Surface: Smooth bore prevents buildup of limescale or biofilm, maintaining consistent flow rates over time.
- Hygienic & Non-Toxic: Certified material for potable water applications; does not leach harmful substances or alter water taste.
- Brass fittings suitable for potable water applications: exclusively made using CW617N brass, meeting stringent health and safety regulations, including EU Directive 98/83/EC and other global standards for drinking water contact.
- Guarantee on the system lifetime

Jointing Technique

Miatherm pipes and fittings are intended for heat fusion. This creates a reliable and leak-free connection. Pipes and fittings can be swiftly connected. When welded according to the guideline, pipe and fittings ensure a leak-free system for the lifetime of the components.

PREPARATION

1. Ensure a clean work space free from liquids and debris.
2. Use a compatible welding device (such as a Miatherm MTEWELD63001)
3. Ensure that the welding sockets are in proper working condition. Do not use worn or dirty welding sockets.
4. With the machine still cold screw on the welding sockets tightly.
5. Important: ensure the machine temperature is set to 260°C.
6. After the set temperature is reached (usually indicated by an indicating lamp on the machine), retighten the sockets
7. You can now proceed with the welding procedure.

N.B: After switching off the device, allow it to cool naturally. Do not use water for cooling, as this poses a risk of injury and may damage electronic components like the thermostat. Clean any contamination using absorbent, lint-free, non-dyed paper and a suitable PP cleaner.

PROCEDURE (ACCORDING TO DVS 2207-11)

1

Set up the welding equipment following the guidelines in the user manual.

2

Ensure the pipe is cut straight—use a pipe shear or cutter specifically designed for PP-R pipes (ex: Miatherm MTECUTT42001).

3

Clean up the pipe edges by deburring and clearing away any cutting debris.

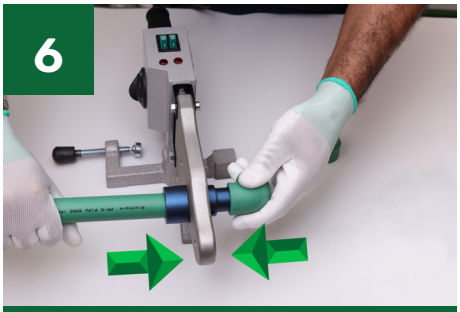
4

Mark the required insertion depth on the pipe according to table below

5

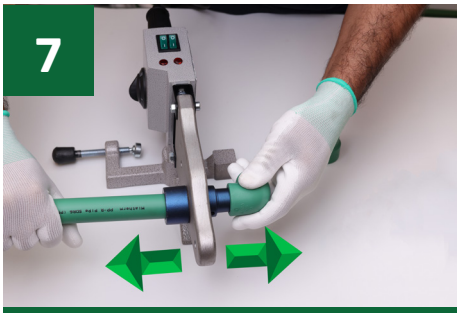
Simultaneously insert the pipe end—without rotating—into the heating sleeve until it reaches the marked insertion depth, and push the fitting onto the welding socket until it contacts the stop

6



Follow the heating-up time specified in the table below. The timing begins once the pipe is fully inserted to the marked depth and the fitting is pressed firmly against the stop.

7



Once the heating-up time has elapsed, quickly remove the pipe and fitting from the heating sleeve and mandrel. Immediately join them together until the insertion depth mark is fully covered by the formed welding bead. Avoid over-inserting the pipe into the fitting, as this may reduce the pipe's internal diameter. Do not rotate the pipe or fitting during this process.

8

During the processing phase, maintain the pipe and fitting in a fixed position relative to each other. While minor alignment adjustments are permitted, rotation between the components is strictly prohibited. After the cooling time is complete, the joint can be subjected to full load. This weld forms a permanent bond, as the pipe and fitting materials have fused together

9

Perform a visual inspection of the weld between the pipe and fitting

Pipe Outside Diameter (mm)	Insertion Depth (mm)	Heating-Up Time (sec)	Processing Time (sec)	Cooling-Down Time (sec)
20	14	5	4	2
25	15	7	4	2
32	16.5	8	6	4
40	18	12	6	4
50	20	18	6	4
36	24	24	8	6
75	26	30	8	6
90	29	40	8	6
110	32.5	50	10	8
125	35	60	10	8

Table: Socket welding guideline as per DVS 2207-11

Note: If the ambient temperature is below +5°C, increase heating-up time by 50%

General Information on Water Supply Systems

DRINKING WATER REGULATIONS

- Drinking water must be safe for human consumption, free from harmful microorganisms and chemicals.
- Governed by the EU Drinking Water Directive (98/83/EC) in Europe. Follow local regulations.
- National laws implement EU requirements and may add specific provisions.
- Chemical treatment of drinking water should follow local regulations. A sample guideline is given below

Substances	CAS No.	EINECS No.	Main Use	Standard Reference	Max Residual After Treatment
Calcium Hypochlorite	7778-54-3	231-908-7	Disinfection	DIN EN 900	Free Cl_2 0.1–0.3 mg/L
Chlorine	7782-50-5	231-959-5	Disinfection; chlorine dioxide production	DIN EN 937	Free Cl_2 0.1–0.3 mg/L
Chlorine Dioxide	10049-04-4	233-162-8	Disinfection	DIN EN 12671	Free ClO_2 0.05–0.2 mg/L
Sodium Hypochlorite	7681-52-9	231-668-3	Disinfection	DIN EN 901 (Table 1, Type 1); $NaClO_3$ impurities < 5.4 %	Free Cl_2 0.1–0.3 mg/L
Ozone	10028-15-6	233-069-2	Disinfection; oxidation	DIN EN 1278 Annex A.3.2	O_3 0.05 mg/L

Table: Approved Water Treatment Chemicals for Miatherm pipes and fittings

Chemical Resistance of pipes and fittings made from Polypropylene (PP)

PP piping systems offer excellent performance across a wide range of chemicals. Actual resistance depends on factors such as fluid type, concentration, temperature, pressure, and duration of exposure, as well as system design and installation conditions.

Classification	Definition	Action
Resistant	Material remains generally unaffected	Suitable for most applications
Conditionally Resistant	May perform well, but requires case-specific evaluation	Conduct further testing before use
Not Resistant	Unsuitable for application	Select an alternative material

Note: For critical applications, consult Miatherm technical support to confirm suitability

Material properties and application limitations

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Acetaldehyde	40%	S	L
	Tech. gr.	L	L
Acetamide	5%	S	S
Acetic acid	Up to 10%	S	S
	>10% to 50%	S	L
	60%	L	L
	80%	L	NS
	95%	S	L
Acetic acid, glacial	>96%	S	L
Acetic anhydrid	Tech. gr.	S	L
Acetone	Tech. gr.	S	S
Acetophenone	Tech. gr.	S	L
Acetyl chloride	Tech. gr.	L	-
Acetylene, gas	Tech. gr.	S	L
Acrylonitrile	Tech. gr.	S	L
Adipic acid	Sat. sol.	S	S
Air	Tech. gr.	S	S
Allyl alcohol	Tech. gr.	L	L
Allyl chloride	Sat. sol.	L	NS
Almond oil	Tech. gr.	S	L
Aluminium chloride	Sat. sol.	S	S
Aluminium fluoride	Susp.	S	S
Aluminium hydroxide	Susp.	S	S
Aluminium nitrate	Sat. sol.	S	S
Aluminium chloride oxyde	Susp.	S	S
Aluminium potassium sulphate	Sat. sol.	S	S
Aluminium sulphate	Sat. sol.	S	S
Ammonia, aqueous	Sat. sol.	S	S

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Ammonia, dry gas	Tech. gr.	S	L
Ammonia, wet gas	Tech. gr.	S	L
Ammonium acetate	Sat. sol.	S	S
Ammonium bifluoride	Sat. sol.	S	S
Ammonium carbonate	Sat. sol.	S	S
Ammonium chloride	Sat. sol.	S	S
Ammonium fluoride	Sat. sol.	S	S
Ammonium hydrogen carbonate	Sat. sol.	S	S
Ammonium metaphosphate	Sat. sol.	S	S
Ammonium molybdate	Sat. sol.	S	S
Ammonium nitrate	Sat. sol.	S	S
Ammonium persulphate	Sat. sol.	S	S
Ammonium phosphate	Sat. sol.	S	S
Ammonium sulphate	Sat. sol.	S	S
Ammonium sulphide	Sat. sol.	S	S
Ammonium thiocyanate	Sat. sol.	S	S
Amyl acetate	Tech. gr.	L	NS
Amyl alcohol	Tech. gr.	S	S
Amyl chloride	Tech. gr.	NS	NS
Aniline	Tech. gr.	L	L
Aniline hydrochloride	Sat. sol.	L	L
Anisole	Tech. gr.	L	NS
Anthraquinone sulphonic acid	Susp.	S	S
Antimony (III) chloride	Sat. sol.	S	S
Apple juice	Work. sol.	S	S
Aqua regia (HCL/HNO3)	67%/33%	NS	NS
Arsenic acid	Sat. sol.	S	S

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Arsenic trioxide	Sol.	L	L
Barium bromide	Sat. sol.	S	S
Barium carbonate	Susp.	S	S
Barium chloride	Sat. sol.	S	S
Barium hydroxide	Sat. sol.	S	S
Barium sulphate	Susp.	S	S
Barium sulphide	Sat. sol.	S	S
Beer	Work. sol.	S	S
Benzaldehyde	10%	S	S
	Tech. gr.	S	L
Benzene	Tech. gr.	L	NS
Benzoic acid	Sat. sol.	S	S
Benzoyl chloride	Tech. gr.	L	-
Benzyl alcohol	Tech. gr.	S	L
Benzyl chloride	Tech. gr.	L	NS
Bismuth carbonate	Sat. sol.	S	S
Borax	Sol.	S	S
Boric acid	Sat. sol.	S	S
Boron trifluoride	Sat. sol.	S	S
Bromic acid	10%	S	S
	50%	NS	NS
Bromine, gas		L	NS
Bromine, liquid	Tech. gr.	NS	NS
Bromine water	Sat. sol.	L	NS
Bromoethane	Tech. gr.	NS	NS
Butadiene, gas	Tech. gr.	L	NS
Butane, gas	Tech. gr.	S	L
Butanediol	10%	S	L
	Tech. gr.	L	L
n-Butanol	Tech. gr.	S	L
Butyl acetate	Tech. gr.	L	L
Butyl glycol	Tech. gr.	S	L
Butylphenol	Sat. sol.	S	L
Butyl phthalate	Tech. gr.	S	L
Butyric acid	20%	S	L
	Tech. gr.	L	L
Butyryl chloride	Tech. gr.	L	-
Calcium bisulphite	Sat. sol.	S	S
Calcium bromide	Sat. sol.	S	S
Calcium carbonate	Susp.	S	S
Calcium chlorate	Sat. sol.	L	L
Calcium chloride	Sat. sol.	S	S
Calcium hydroxide	Sat. sol.	S	S
Calcium hypochlorite	10%	L	L
Calcium nitrate	Sat. sol.	S	S
Calcium sulphate	Susp.	S	S

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Calcium sulphide	Dil. sol.	S	S
Calcium hydrogen sulphide	Sol.	S	S
Camphor oil	Tech. gr.	NS	NS
Carbon dioxide, aqueous sol.	Sat. sol.	S	S
Carbon dioxide, dry gas	Tech. gr.	S	S
Carbon dioxide, wet gas	Tech. gr.	S	S
Carbon disulphide	Tech. gr.	L	NS
Carbon monoxide, gas	Tech. gr.	S	S
Carbon tetrachloride	Tech. gr.	NS	NS
Castor oil	Tech. gr.	S	S
Chlorine, dry gas	Tech. gr.	NS	NS
Chlorine water	Sat. sol.	L	NS
Chlorine, wet gas	Tech. gr.	NS	NS
Chloroacetic acid	Sat. sol.	S	S
Chlorobenzene	Tech. gr.	L	NS
Chlorobromo-methane	Tech. gr.	L	NS
Chloroethanol	Tech. gr.	S	L
Chloroform	Tech. gr.	L	NS
Chloromethane, gas	Tech. gr.	L	NS
Chloropropanes	Tech. gr.	NS	-
Chlorosulphonic acid	50%	NS	NS
Chrome alum	Sat. sol.	S	S
Chromic acid	<25%	L	L
	>30% to 50%	L	NS
Citric acid	Sat. sol.	S	S
Coconut oil	Work. sol.	S	S
Cod. liver oil	Work. sol.	S	S
Copper (II) chloride	Sat. sol.	S	S
Copper (II) cyanide	Sat. sol.	S	S
Copper (II) fluoride	Sat. sol.	S	S
Copper (II) nitrate	50%	S	S
Copper (II) sulphate	Sat. sol.	S	S
Corn oil	Work. sol.	S	L
Cottonseed oil	Work. sol.	S	-
Cresols	Tech. gr.	S	L
Cresylic acid	Sat. sol.	NS	NS
Crotonaldehyde	Sat. sol.	S	L
	Tech. gr.	S	NS
Crude oil (free from aromatics)	Tech. gr.	L	NS
Cyclohexane	Tech. gr.	S	NS
Cyclohexanol	Sat. sol.	S	L
Cyclohexanone	Tech. gr.	L	NS
Cyclohexylamine	Tech. gr.	L	NS
Decalin	Tech. gr.	NS	NS
Dextrin	Sol.	S	S

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Dextrose	Sol.	S	S
Diacetone alcohol	Tech. gr.	L	L
Diazonium chloride	Work. sol.	L	-
Dichloroacetic acid	50%	S	L
	Tech. gr.	L	-
Dichlorobenzene	Tech. gr.	L	-
Dichloroethylene	Tech. gr.	NS	NS
Diesel fuel	Work. sol.	L	L
Diethanolamine	Tech. gr.	S	L
Diethylamine	Tech. gr.	S	NS
Diethyl ether	Tech. gr.	L	NS
Diethylene glycol	Tech. gr.	S	S
Diglycolic acid	18%	S	S
	Sat. sol.	S	L
Diisooctyl phthalate	Tech. gr.	S	L
Dimethylamine	30%	S	-
Dimethylamine, gas	Tech. gr.	S	L
Dimethyl- formamide	Tech. gr.	S	S
Dioctyl phthalate	Tech. gr.	L	L
Dioxane	Tech. gr.	S	L
Diphenylamine	Work. sol.	L	NS
Ethanol	Tech. gr.	S	S
Ethanolamine	Tech. gr.	S	L
Ethyl acetate	Tech. gr.	L	NS
Ethyl acrylate	Tech. gr.	L	NS
Ethyl chloride, gas	Tech. gr.	NS	NS
Ethylene bromide	Tech. gr.	L	NS
Ethylene chlorohydrin	Tech. gr.	L	L
1,1 Ethylene dichloride	Tech. gr.	L	L
1,2 Ethylene dichloride	Tech. gr.	L	NS
Ethylene glycol	Tech. gr.	S	S
Ethyl ether	Tech. gr.	L	L
Ethyl glycol	Tech. gr.	S	NS
Ethylene oxide	Tech. gr.	L	NS
Ferric chloride	Sat. sol.	S	S
Ferric nitrate	Sat. sol.	S	S
Ferric sulphate	Sat. sol.	S	S
Ferrous chloride	Sat. sol.	S	S
Ferrous sulphate	Sat. sol.	S	S
Fluoboric acid	Sat. sol.	S	L
Fluorine, dry gas	Tech. gr.	NS	NS
Fluosilicic acid	Sat. sol.	S	L
	>25 to 32%	S	S
	>40%	S	L
Formaldehyde	Dil. sol.	S	NS
	>30 to 50%	S	NS

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Formic acid	10%	S	L
	>40 to 50%	L	L
	>85% to tech. gr.	L	NS
Freon 12	Work. sol.	L	NS
Freon 22, gas	Tech. gr.	L	NS
Fructose	Sol.	S	S
Fruit juice	Work. sol.	S	S
Furfuryl alcohol	Tech. gr.	S	L
Gas, natural, dry	Tech. gr.	S	L
Gas, natural, wet	Tech. gr.	S	-
Gasoline (fuel) (free from aromatics)	Work. sol.	L	NS
Gelatine	Sol.	S	S
Ginger ale	Work. sol.	S	S
Glucose	Sol.	S	S
Glycerine	Tech. gr.	S	S
Glycolic acid	<65%	L	L
Grapefruit juice	Work. sol.	S	S
Heptane	Tech. gr.	L	NS
Hexadecanol	Work. sol.	S	-
Hexane	Tech. gr.	S	L
1-Hexanol	Tech. gr.	S	S
Honey	Work. sol.	S	S
Horseradish	Work. sol.	S	S
Hydrobromic acid	<20%	S	S
	>20 to 50%	S	L
	66%	L	NS
Hydrochloric acid	<25%	S	L
	>25 to 37,5%	L	L
Hydrochloric acid, dry gas	Tech. gr.	S	NS
Hydrochloric acid, wet gas	Tech. gr.	S	NS
Hydrocyanic acid	Tech. gr.	S	NS
Hydrofluoric acid	<40%	S	L
	50%	L	-
	>50 to 70%	L	NS
Hydrofluoric acid, gas	Tech. gr.	NS	-
Hydrogen, gas	Tech. gr.	S	S
Hydrogen peroxide	<10%	S	L
	>30 to 70%	L	L
	70%	L	NS
Hydrogen sulphide aqueous	Sat. sol.	S	S
Hydrogen sulphide, dry gas	Tech. gr.	S	S
Hydroquinone	Sat. sol.	S	L
Hypochlorous acid	<70%	L	NS
Iodine	Sat. sol.	NS	NS
Iodine, in alcohol	Work. sol.	L	L

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Isobutyl alcohol	Tech. gr.	S	L
Isobutyronitrile	Tech. gr.	L	NS
Isooctane	Tech. gr.	L	L
Isopropyl acetat	Tech. gr.	S	L
Isopropyl alcohol	Tech. gr.	S	S
Isopropyl ether	Tech. gr.	L	NS
Kerosene	Work. sol.	L	L
Lactic acid	<90%	S	S
	Tech. gr.	S	L
Lanolin	Work. sol.	S	L
Lauryl chloride	Sat. sol.	L	NS
Lead acetate	Dil. sol.	S	S
Lead tetraethyl	Tech. gr.	S	-
Linseed oil	Work. sol.	S	S
Magnesium carbonate	Susp.	S	S
Magnesium chloride	Sat. sol.	S	S
Magnesium hydroxide	Sat. sol.	S	S
Magnesium nitrate	Sat. sol.	S	S
Magnesium sulphate	Sat. sol.	S	S
Maleic acid	Sat. sol.	S	S
Malic acid	Sat. sol.	S	S
Margarine	Work. sol.	S	S
Mayonnaise	Work. sol.	S	S
Mercuric chloride	Sat. sol.	S	S
Mercuric cyanide	Sat. sol.	S	S
Mercurous nitrate	Sat. sol.	S	S
Mercury	Tech. gr.	S	S
Mesityl oxide	Work. sol.	NS	NS
Methane, gas	Tech. gr.	S	L
Methyl acetate	Tech. gr.	S	S
Methyl alcohol	5%	S	L
	Tech. gr.	S	S
Methyl bromide, gas	Tech. gr.	NS	NS
Methyl butyl ketone	Tech. gr.	S	L
Methyl cyclohexanones	Tech. gr.	L	-
Methyl ethyl ketone	Tech. gr.	S	L
Methyl glycol	Work. sol.	S	L
Methyl methacrylate	Tech. gr.	S	S
Methyl sulphate	Work. sol.	L	-
Methyl sulphonic acid	Tech. gr.	L	L
Methylamine	<32%	S	NS
Methylene chloride	Tech. gr.	-	-
Milk	Work. sol.	S	S
Mineral oils (free from aromatics)	Work. sol.	S	L
Molasses	Work. sol.	S	S
Mustard, aqueous	Work. sol.	S	-

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Naphtha	Work. sol.	L	NS
Naphthalene	Work. sol.	L	L
Nickel acetate	Sat. sol.	S	S
Nickel chloride	Sat. sol.	S	S
Nickel nitrate	Sat. sol.	S	S
Nickel sulphate	Sat. sol.	S	S
Nicotin acid	Susp.	S	-
Nitric acid	5%	L	L
	>10 to 30%	L	NS
	>35%	NS	NS
Nitric acid (with nitrogen dioxide)	Fuming	NS	NS
Nitrobenzene	Tech. gr.	S	L
Nitromethane	Tech. gr.	S	L
Oleic acid	Tech. gr.	S	L
Oleum		NS	NS
Olive oil	Work. sol.	S	L
Oxalic acid (subl.)	Dil. sol.	S	S
	Sat. sol.	S	L
Oxygen, gas	Tech. gr.	S	L
Ozone, gas	Sat. sol.	NS	NS
Paraffin	Tech. gr.	S	S
Paraffin oil	Tech. gr.	S	L
Peanut oil	Work. sol.	S	L
Pentane	Work. sol.	L	L
Peppermint oil	Work. sol.	S	L
Perchloro- ethylene	Work. sol.	L	NS
Perchloric acid	10%	L	L
	20%	L	NS
	70	L	-
Petrol (aliphatic hydrocarbon / benzene)	80/20%	L	NS
Petroleum ether (ligroin)	Work. sol.	L	L
Phenol	Sol.	S	L
	5%	S	S
	50%	S	-
	90%	S	L
Phenylhydrazine	Tech. gr.	L	L
Phenylhydrazine hydrochloride	Dil. sol.	S	L
	97%	S	NS
Phosphine, gas	Tech. gr.	L	L
Phosphoric acid	<98%	S	S
Phosphorus (III) chloride	Tech. gr.	L	-
Phosphorus oxychloride	Tech. gr.	L	L
Phthalic acid	Susp.	S	S
Picric acid (subl.)	Sat. sol.	S	L

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Potassium bicarbonate	Sat. sol.	S	S
Potassium bisulphate	Sat. sol.	S	S
Potassium borate	Sat. sol.	S	S
Potassium bromate	Sat. sol.	S	S
Potassium bromide	Sat. sol.	S	S
Potassium carbonate	Sat. sol.	S	S
Potassium chlorate	Sat. sol.	S	L
Potassium chloride	Sat. sol.	S	S
Potassium chlorite	Sat. sol.	S	S
Potassium chromate	Sat. sol.	S	L
Potassium cuprocyanide	Sat. sol.	S	S
Potassium cyanide	Sol.	S	S
Potassium dichromate	Sat. sol.	S	L
Potassium ferricyanide	Sat. sol.	S	S
Potassium fluoride	Sat. sol.	S	S
Potassium hexacyanoferrate (II)	Sat. sol.	S	S
Potassium hydrogen sulphite	Sat. sol.	S	S
Potassium hydroxide	<20%	S	S
	<50%	L	L
Potassium hypochlorite	Sol.	L	-
Potassium iodide	Sat. sol.	S	S
Potassium nitrate	Sat. sol.	S	L
Potassium orthophosphate	Sat. sol.	S	S
Potassium perborate	Sat. sol.	S	S
Potassium perchlorate	10%	S	L
	Sat. sol.	L	L
Potassium permanganate	Sat. sol.	L	L
Potassium persulphate	Sat. sol.	S	S
Potassium sulphate	Sat. sol.	S	S
Potassium sulphide	Sat. sol.	S	S
Potassium sulphite	Sat. sol.	S	S
Potassium, thiosulphate	Sat. sol.	S	S
Propane, gas	Tech. gr.	S	L
Propionic acid	50%	S	L
	Tech. gr.	L	L
Propyl alcohol	Tech. gr.	S	S
Pyridine	Tech. gr.	L	L
Salicylic acid (subl.)	Sat. sol.	S	S
Selenic acid	Sat. sol.	S	S
Silicic acid	Susp.	S	S
Silicone oil	Tech. gr.	S	S
Silver acetate	Sat. sol.	S	S
Silver cyanide	Sat. sol.	S	S
Silver nitrate	Sat. sol.	S	S
Sodium acetate	Sat. sol.	S	S

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Sodium antimonite	Sat. sol.	S	S
Sodium arsenite	Sat. sol.	S	S
Sodium benzoate	Up to 50%	S	L
Sodium bicarbonate	Sat. sol.	S	S
Sodium bisulphate	Up to 50%	S	S
Sodium bromide	Up to 50%	S	S
Sodium carbonate	Up to 50%	S	S
Sodium chlorate	Sat. sol.	S	L
Sodium chloride	Sat. sol.	S	S
Sodium chlorite	2%	S	L
	20%	S	L
Sodium chromate	Dil. sol.	S	S
Sodium cyanide	Sat. sol.	S	S
Sodium dichromate	Sat. sol.	S	L
Sodium ferricyanide	Sat. sol.	S	S
Sodium ferrocyanide	Sat. sol.	S	S
Sodium fluoride	Sat. sol.	S	S
Sodium hydrogen sulphite	Sat. sol.	S	S
Sodium hydroxide	Dil. Sol.	S	S
	Sat. sol.	S	L
	<10%	S	S
	>10 to 60%	S	L
Sodium hypochlorite	2% Cl (% of free chlorine)	L	-
	12,5% Cl (% of free chlorine)	L	-
Sodium metaphosphate	Sol.	S	S
Sodium nitrate	Sat. sol.	S	L
Sodium nitrite	Sat. sol.	S	S
Sodium perborate	Sat. sol.	S	S
Sodium phospate, acid	Sat. sol.	S	S
Sodium phospate, neutral	Sat. sol.	S	S
Sodium silicate	Sat. sol.	S	S
Sodium sulphate	Sat. sol.	S	S
Sodium sulphide	Sat. sol.	S	S
Sodium sulphite	40%	S	S
Sodium thiosulphate (hyposulphite)	Sat. sol.	S	S
Soybean oil	Work. sol.	S	L
Stearic acid	Work. sol.	S	L
Stearin	Work. sol.	S	L
Styrene	Sat. sol.	L	NS
Sugar, aqueous sol.	Sol.	S	S
Sulphur dioxide, dry gas	Work. sol.	S	S
Sulphur dioxide, wet gas	Work. sol.	S	S
Sulphur ether (thioether)	Work. sol.	L	NS

Flow Substance	Concentration	Behavior at	
		20°C	60°C
Sulphuric acid	>10 to 30%	S	S
	>50 to 70%	S	L
	>80 to 90%	L	NS
	>95%	NS	NS
	Fuming	NS	NS
Sulphurous acid	Sat. sol.	S	L
Tannic acid	Sat. sol.	S	L
Tartaric acid	Sat. sol.	S	S
Tetrahydrofuran	Tech. gr.	NS	NS
Tetralin	Tech. gr.	NS	NS
Thionyl chloride	Tech. gr.	NS	NS
Thiophene	Tech. gr.	L	L
Tin (II) chloride	Sat. sol.	S	S
Tin (IV) chloride	Sol.	S	S
Toluene	Tech. gr.	L	NS
Tributyl- phosphate	Sat. sol.	S	L
Trichloroacetic acid	<50%	S	S
Trichloro- benzene	Work. sol.	NS	NS
Trichloro- ethylene	Tech. gr.	L	L
Triethanolamine	Sol.	S	S
	Tech. gr.	S	L
Triethylene glycol	Sol.	S	S
Trimethylol- propane	<10%	S	S
Turpentine	Tech. gr.	L	NS
Urea	Sat. sol.	S	S
Uric acid	Work. sol.	S	S
Urine	Work. sol.	S	S
Vegetable oils	Tech. gr.	S	L
Vinegar	Work. sol.	S	S
Vinyl acetate (monomer)	Tech. gr.	S	L
Water, distilled	Work. sol.	S	S
Water, sea	Work. sol.	S	S
Whiskey	Work. sol.	S	L
Wine	Work. sol.	S	S
Wines and spirits	Work. sol.	S	S
Xylene	Tech. gr.	L	NS
Yeast	Susp.	S	-
Zinc carbonate	Sat. sol.	S	S
Zinc chloride	Sat. sol.	S	S
Zinc chromate	Sat. sol.	L	L
Zinc cyanide	Sat. sol.	S	S
Zinc nitrate	Sat. sol.	L	L
Zinc oxide	Susp.	S	S
Zinc stearate	Susp.	S	S
Zinc sulphate	Sat. sol.	S	S

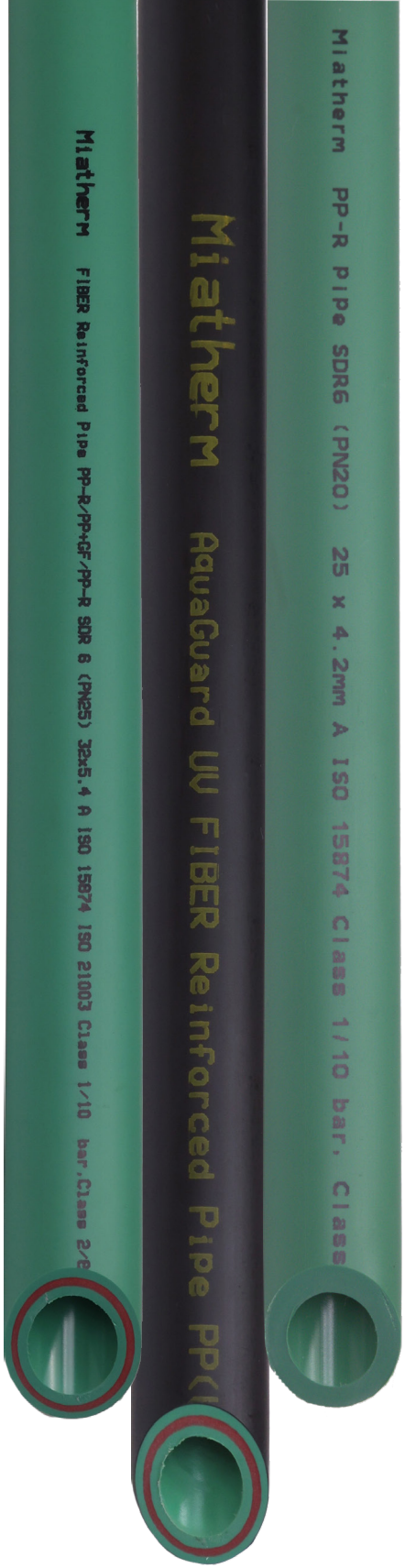


Table: Chemical resistance of polypropylene, not subjected to mechanical stress, to various fluids at 20 and 60°C (source: ISO/TR 10358)

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