novatherm®

PP-R PIPES AND FITTINGS

Novatherm Plastic Pipes and Fittings are produced in Novaplast facilities located in Turkey. The company headquarters is in Istanbul and one of the leading supplier of plastic systems since 1992.

Novatherm products have been offering solutions mainly to the water transport needs of the construction sector in residential buildings and in infrastructure. Engineers, consultants, architects, plumbers and contractors from all around the world prefer the quality of Novatherm products in areas such as hot and cold water supply, under-floor heating systems.

All Novatherm products comply with the international quality requirements and are certified by the most prestigious testing authorities in the world. Novatherm products have SKZ, Hygiene-Institut and Kreis Recklinghausen certification from Germany, AENOR quality certificate from Spain, SGR quality certificate from Russia, Bulgar Kontrola from Bulgaria, Certif from Portugal and WRAS quality certificate from UK.

Novaplast is honored to be one of the few companies in Europe producing its PP-R pipes and fittings under the inspection of South Germany Plastics Center and to be authorized to use their SKZ logo on its products. Novatherm's good reputation on quality is a well-deserved result of the meticulous work of its production and quality departments that keep the production under strict control round-the-clock by an experienced group of engineers and technicians.

Novaplast is one of the major manufacturers of the pipe industry in Turkey.

Novatherm Limited Sirketi is foreign trade company of Novatherm products for export markets.

Revised at 2024

1. CHARACTERISTICS

1.1 General

Raw Material

NOVATHERM PP-R pipes and fittings are manufactured from high quality, Polypropylene Random Copolymer resins (PP-R Type 3). Its physical and chemical properties make NOVATHERM a versatile piping system in a wide range of applications in different industries.

Its advantages over PP types 1 or 2 and other thermoplastic pipes in the potable water industries are its high impact strength and resistance to high temperatures.

1.2 Mechanical & Thermal Properties

Property	Test Method	Unit	Value
Melt Flow Rate			
MFI 190/5	ISO 1133	g/10 min.	0.5
MFI 230/2.16	ISO 1133	g/10 min.	0.3
MFI 230/5	-	g/10 min.	1.5
Density at 23°C	ISO 1183	g/cm³	0.900
Tensile Stress at Yield	ISO 527	MPa	25
Elongation at Break	ISO 527	%	> 50
Modulus of Elasticity, Tensile Test	ISO 527	N/mm²	900
Impact Strength (Charpy)			
23°C	ISO 179/1eU	kj/m²	no failure
0°C	ISO 179/1eU	kj/m²	no failure
-10°C	ISO 179/1eU	kj/m²	no failure
Notched Impact Strength (Charpy)			
23°C	ISO 179/1eA	kj/m²	20
0°C	ISO 179/1eA	kj/m²	4
-10°C	ISO 179/1eA	kj/m²	3
Coefficient of Linear Thermal Expansion	DIN 53 752	K^{-1}	1.5×10^{-4}
Thermal Conductivity at 20°C	DIN 52 612	W/mK	0.24
Specific Heat at 20°C	Adiabatic Calorimeter	kj/kg K	2.0

1.3 Application Areas

1.4 Behaviour of NOVATHERM According to DIN 8078 Under Long Term Hoop Stress

The service life of NOVATHERM depends on the internal hoop stress over time subject to the temperature.

Hoop stress is given as follows:

$$\delta = \frac{P \times (d - s)}{20 \times s}$$

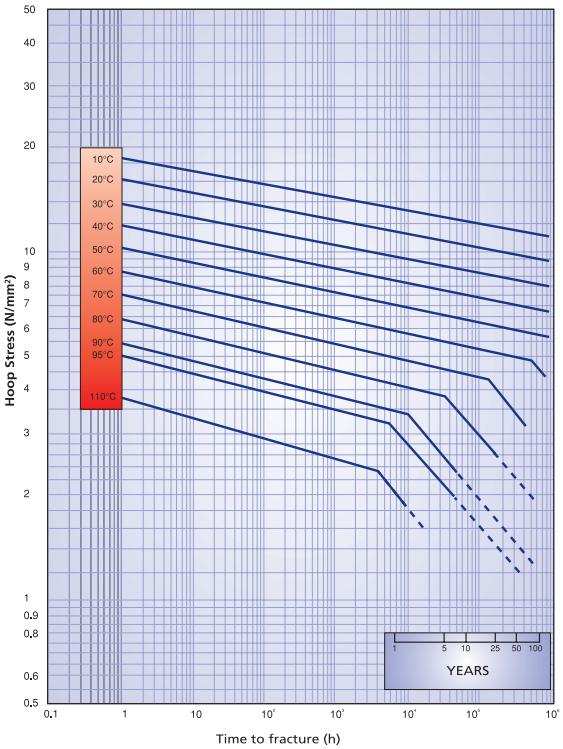
where

δ = Hoop stress (N/mm² or MPa)

P = Internal pressure (bar)

d = Outer diameter of pipe (mm)

S = Wall thickness of pipe (mm)



1. CHARACTERISTICS

1.5 Permissible Operating Pressure

Projected Service Life

The table on the right provides more detailed information with regards to the permissible pressure of various pipe pressure rating at various temperatures. These values are derived from the hoop stress chart and formula.

Under normal working pressures and conditions, the average service life of NOVATHERM pipes is projected to be 50 years or more.

Examples:

A PN 10 cold water pipe, transporting water at a temperature of 30°C can last for more than 50 years under normal conditions with an operating pressure of 10.9 bars or 158 psi.

A PN 20 hot water pipe, transporting water at a temperature of 70°C can last for more than 50 years under normal conditions with an operating pressure of 8.5 bars or 123 psi.

Temperature	Service life (years)	For water installations according to DIN 8077 safety factor of 1.5			
		NOVATHERM Pipe SDR 1.1	NOVATHERM Pipe SDR 7.4	NOVATHERM Pipe SDR 6	NOVATHERM Stable Pipe
		Nominal pressure in bars			
		PN 10 Cold water	PN 16 Hot & Cold Water	PN 20 Hot & Cold Water	PN 25 Hot & Cold Water
		Permissible working pressure at various temperatures (bars)			
20°C	1	15,0	22,3	30,0	37,8
	5	14,1	21,7	28,1	35,4
	10	13,7	21,1	27,3	34,4
	25	13,3	20,4	26,5	33,4
	50	12,9	20,2	25,7	32,4
30°C	1	12,8	19,0	25,5	32,1
	5	12,0	18,3	23,9	30,1
	10	11,6	17,7	23,1	29,1
	25	11,2	17,3	22,3	28,1
	50	10,9	17,1	21,8	27,4
40°C	1	10,8	16,0	21,5	27,1
	5	10,1	15,6	20,2	25,5
	10	9,8	15,0	19,6	24,7
	25	9,4	14,5	18,8	23,7
	50	9,2	14,5	18,3	23,1
50°C	1	9,2	13,5	18,3	23,1
	5	8,5	13,1	17,0	21,4
	10	8,2	12,6	16,5	20,7
	25	8,0	12,2	15,9	20,0
	50	7,7	12,2	15,4	19,4
60°C	1	7,7	11,4	15,4	19,4
	5	7,2	11,0	14,3	18,0
	10	6,9	10,5	13,8	17,4
	25	6,7	10,1	13,3	16,7
	50	6,4	10,3	12,7	16,0
70°C	1	6,5	9,5	13,0	16,4
	5	6,0	9,3	11,9	15,0
	10	5,9	8,0	11,7	14,7
	25	5,1	6,7	10,1	12,7
	50	4,3	8,6	8,5	10,7
80°C	1	5,5	7,6	10,9	13,7
	5	4,8	6,3	9,6	12,0
	10	4,0	5,1	8,0	10,0
	25	3,2	6,1	6,4	8,0
90°C	1	3,9	4,0	7,7	9,7
	5	2,5		5,0	6,3

1.6 Hygiene & Health Concerns

Health is taken as a major concern during production of NOVATHERM pipes and fittings.

Connection of pipes does not require additives such as cement solvent, fluxes or solder. To ensure the safety of NOVATHERM pipes and fittings for usage relating to human contact and consumption with potable water the following are strictly adhered to:

· DIN 1988 Part 2
- Drinking Water Supply Systems, Materials, Components, Appliances, Design and Installation

· DVGW - TZW
- Test Certificate based on KTW recommendations for Materials in Contact with Drinking Water

· WRC
- Test Certificate
- Water Bylaws Scheme/WRc, Tests of Effect on Water Quality based on BS 6920

1.7 UV Resistance

NOVATHERM Products are produced with UV stabilisers. However, like all other piping systems including metal pipe works should not be left exposed under direct sunlight without insulating or protection from direct sunlight or UV radiation.

1.8 Fire Classification

NOVATHERM pipes and fittings comply and are classified under the requirements of the fire classification, B2 (normally inflammable) according to DIN 4102. In case of a fire outbreak of temperature >800°C, under ideal conditions, with sufficient oxygen, only carbon dioxide and water vapour are produced as the raw material of Polypropylene Random Copolymer is a hydrocarbon chain. Toxic fumes or dioxin will not be emitted.

1. CHARACTERISTICS

1.9 Sound Insulation

Compared to metallic pipes, NOVATHERM does not need further insulation to decrease the decibel level when water flows at relatively high speeds. The reason is simply that metals transmit noises quicker and louder, whereas, plastics dampen the noises. Hence "whistling" and noises resulting from water hammer effect are largely reduced to non-existence.

1.10 Advantages of Using NOVATHERM

From the above properties of NOVATHERM systems and application areas, compared to other conventional metal or plastic piping systems NOVATHERM has the following advantages which makes it 'THE SYSTEM OF THE NEW MILLENNIUM'.

- Not detrimental to human health;
- Rust and corrosion free;
- Rupture free;
- No scaling;
- High resistance to acids and chlorides;
- Noise free at high flow rates;
- High pressure tolerances and rating;
- Insulation is not necessary for interior applications light weight;
- Speed and ease of fusion technology;
- Extensive savings in time and labour.

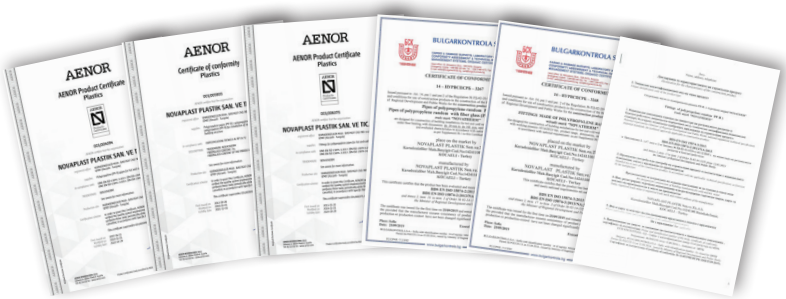
2. QUALITY ASSURANCE

2.1 Standards

Pipes & Fittings

EN ISO 15874	: Plastic Piping Systems for Hot and Cold Water Installations - Polypropylene (PP)
DIN 8077	: Polypropylene Pipes, Dimensions
DIN 8078	: Polypropylene Pipes, General Quality Requirements and Testing
DIN 16962	: Pipe Joints and Elements for Polypropylene Pressure Pipes
DIN 16928	: Pipe Joints, Elements for Pipes, Laying General Conditions
DIN 1988	: Drinking Water Supply Systems, Materials, Components, Appliances, Design and Installation
DIN 2999	: Threads for Pipes and Fittings
DVGW W 542	: Composite Pipes for Drinking Water Installations-Quality Requirements and Testing
DVGW W 270	: Reproduction of Microorganisms on Materials for Drinking Water Applications
KTW Requirements	: Plastics Used for Drinking Water
DVS 2207	: Welding of Thermoplastic Materials
DVS 2208	: Machines and Instruments for Welding of Thermoplastic Materials

2.2 Quality and Hygiene Certificates

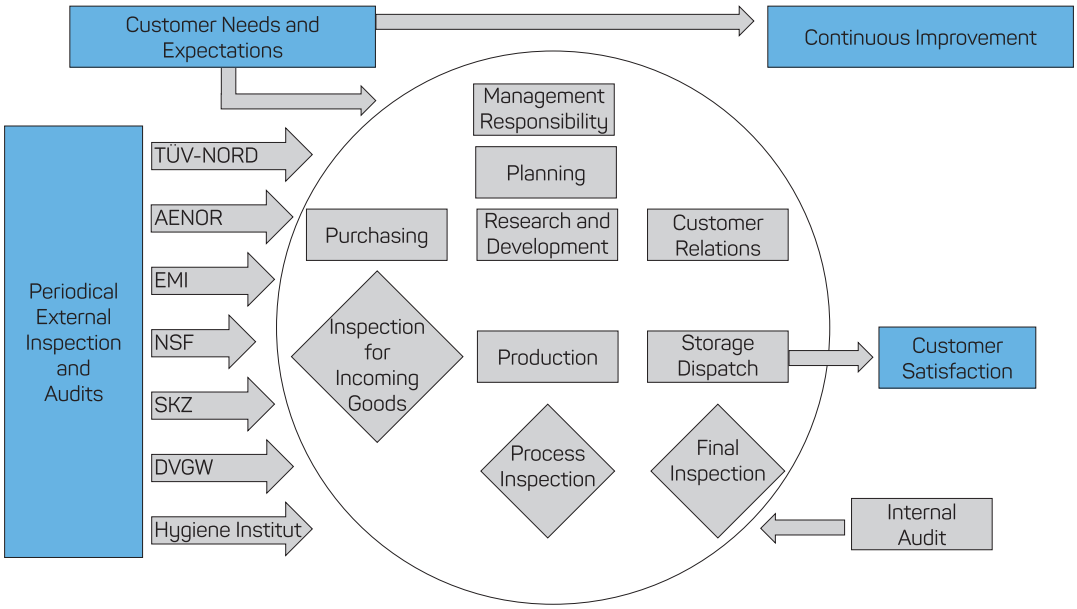


2. QUALITY ASSURANCE

2.3 Quality as the Strategic Focus

Quality process is an integral part of everything NOVATHERM does. Quality action teams of NOVATHERM throughout the world are continually working to improve products, processes and procedures to better meet customer requirements.

We have learned and adapted many of the best practices of successful quality management systems to create our own NOVATHERM Quality System. There is no end for quality. NOVATHERM Quality System is designed to be a cycle:



Quality is engineered into NOVATHERM products during the entire manufacturing process. The three phases of quality control involve the incoming raw material, the pipe production, and the finished product. The combination of all three areas ensures that the final product will fulfill the requirements and meet the desired specifications.

2.4 Internal Control

NOVATHERM pipes and fittings are periodically subjected to the following extensive test program according to the standards.

Material Characterization Tests

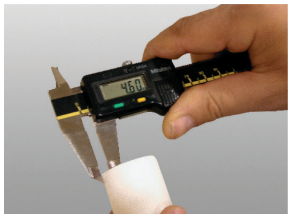
Testing the incoming resin is the first step in the quality control program. It is usually checked for contamination, melt index and density. Any resin that does not meet the raw material specifications is not used for the production.

Thermal Reversion Properties

Thermal properties of plastic materials are equally important as mechanical properties. Unlike metals, plastics are extremely sensitive to changes in temperature. This difference in the coefficient of thermal expansion develops internal stresses and stress concentrations in the polymer. Pipes are subjected to thermal stresses inside a thermostatic chamber with a continuous air circulation to observe shrinkage in accordance with DIN 8078.

Dimensional Tests

Pipe diameter, wall thickness, ovality, and length are measured on a regular basis to insure compliance with the prevailing specification. The outside diameter wall thickness shall comply with the DIN 8077 specifications.



2. QUALITY ASSURANCE

Mechanical Tests

Impact Strength

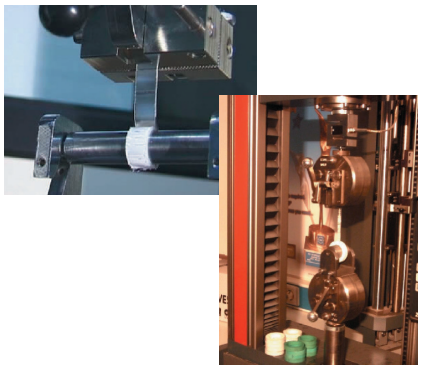
Impact resistance is the ability of a material to resist breaking under a shock loading. Standard test specimens prepared from NOVATHERM pipes are subjected to a pendulum type impact load in accordance with DIN 8078.

Creep Strength Test

NOVATHERM Pipes are subjected to creep tests according to DIN 8078 that determines their service life and that provides the required information about the mechanical characteristics of the pipe. The long-term burst strength of pipes is determined by subjecting the pipes to constant internal pressure and observing time-to-failure.

Separation Test

Strength of the binding layers between the internal and aluminium layer of NOVATHERM Stable Pipes are examined by separation test.



2.5 External Control

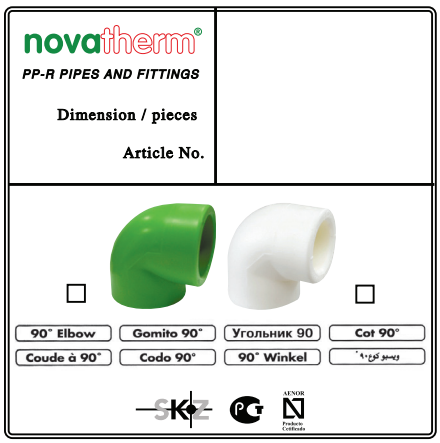
Beside the internal controls which are planned and maintained by qualified NOVATHERM technical departments, there are also periodic external controls carried out by independent international organizations like TÜV-NORD, SKZ, WRAS, AENOR, and Hygiene Institut. These controls include both product testing according to relevant standards and whole quality system controls. Therefore external controls are the main tools for us to ensure the highest quality products hence satisfying our customers' expectations.

2.6 Locate and Trace Tools

Locate and trace tools make easier handling (H), loading (L), storing (S) and tracing (T) processes with visual locating and comprehensive feedback data.

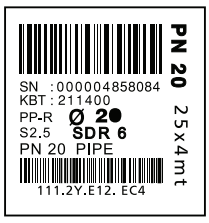
Multilingual Fittings Labels (H,L,S)

On each NOVATHERM fitting box you will find a green tag on which article's dimension, code, and quantity are mentioned. You could also see the article's name in eight languages as follows:



Pipe Tag (H, L, S, T)

Pipe tags found in the front side of the pipe sacks make an easy storage available. They help to distinguish pipe types both with the information given on them and with their different colours. Barcodes on the tags provide a dispatching from the plant without any problems and an easy counting & storing process in the customers' warehouses. Furthermore, each tag Includes a dispatching number that provides an easy feedback for us.



QC Tag (T)

The Quality Control Tags which will be found in the fittings' bags are the tools for us to improve NOVATHERM Quality System. The feedback from our customers giving the follow-up numbers of fittings having defects enable us to maintain traceability. The raw material properties, the production date and hour, the machine and its set and actual values during the production, the start-up values, the final inspection values and the packing information of that fitting can be obtained. All those results lead us to revise and improve the quality system.

3. PRODUCT RANGE

3.1 NOVATHERM Composite Faser Pipe

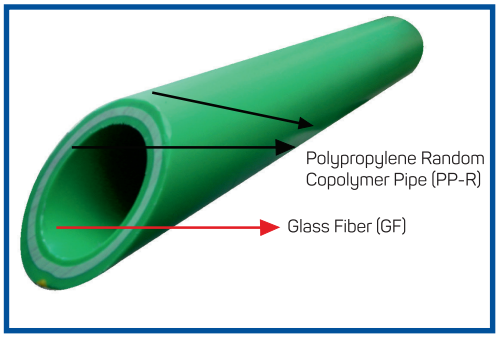
NOVATHERM Faser Pipe is the latest addition to the PP-R pipe range.

It is a composite pipe consisting of 3 Layers, with 20% glass fiber / PP-R, sandwiched between PP-R material in the inner layer and on the surface layer i.e. PP-R / GF / PP-R.

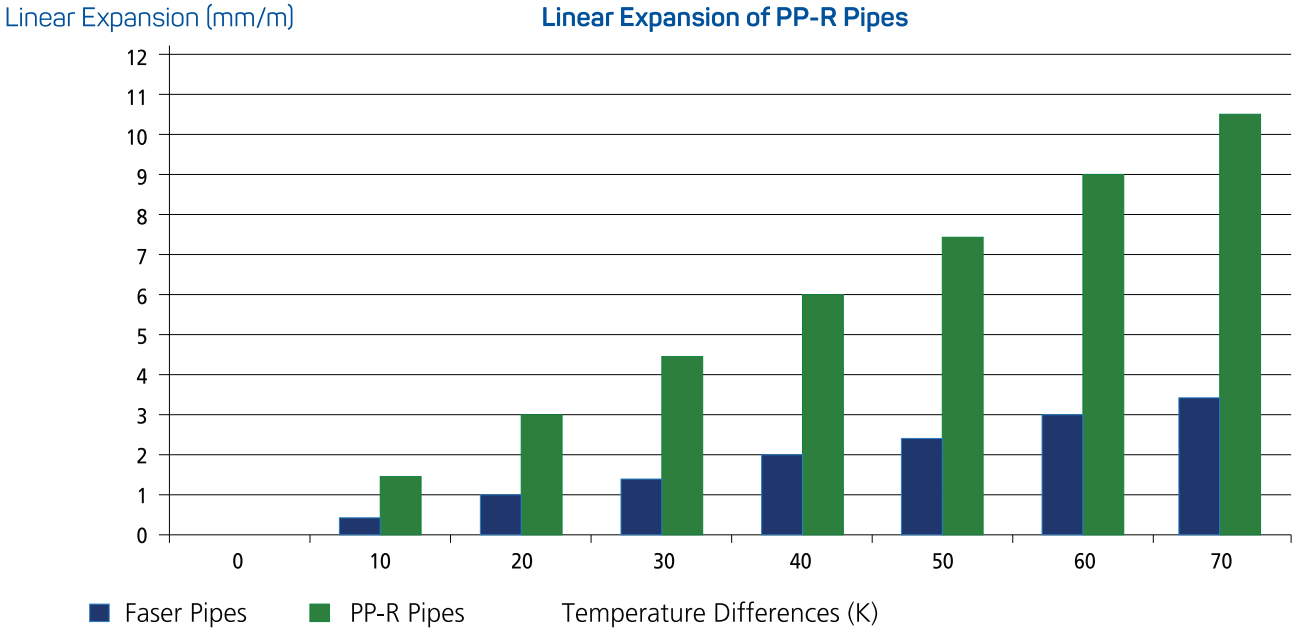
Faser pipes are used for chilled and hot water reticulation systems.

Linear Expansion

Compared to normal PP-R pipes, faser pipes have a much lower extension when transporting hot water. As such, faser pipes remain relatively straight at high temperatures. Pipe supports can be minimized.



Coefficient of linear thermal expansion of NOVATHERM faser pipes is 0.04 mm/mK



Faser Pipe (SDR 7.4) PN 20

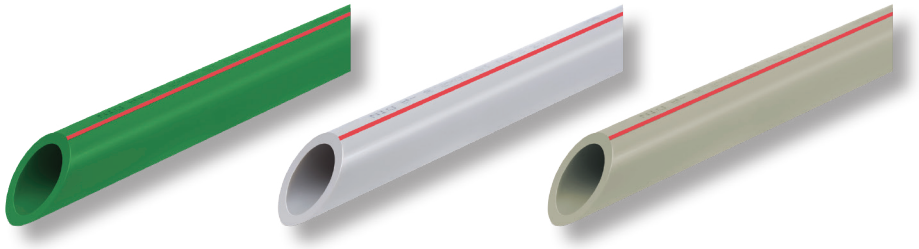
Faser pipe is an alternative to aluminium foiled pipes. Its advantages are:

- No need to shave:
- Lighter in weight;
- Less expensive.

3. PRODUCT RANGE

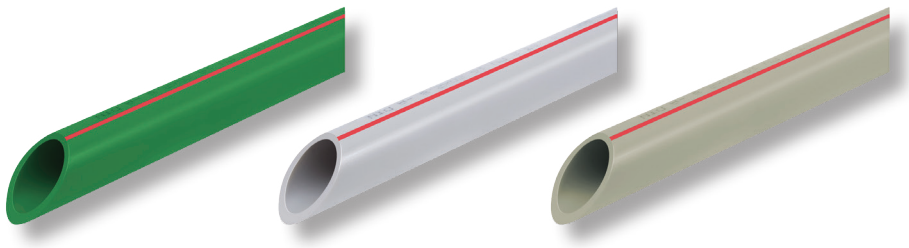
HOT & COLD WATER PIPE PN 20 (SDR 6)

OD x THICKNESS mm	m/PACK
20 x 3.4	100
25 x 4.2	100
32 x 5.4	100
40 x 6.7	60
50 x 8.3	40
63 x 10.5	28
75 x 12.5	20
90 x 15.0	12
110 x 18.3	8
125 x 20.8	4
160 x 26.6	4
● 200 x 33.2	1



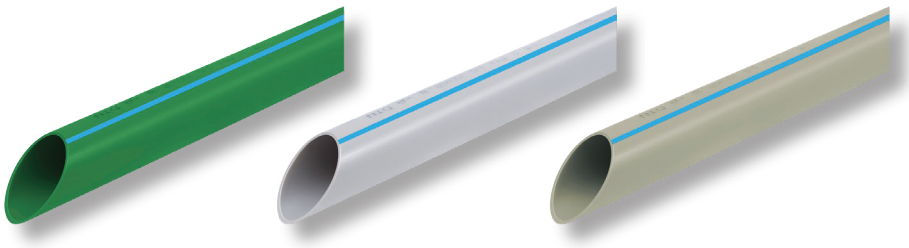
HOT & COLD WATER PIPE PN 16 (SDR 7.4)

OD x THICKNESS mm	m/PACK
20 x 2.8	100
25 x 3.5	100
32 x 4.4	100
40 x 5.5	60
50 x 6.9	40
63 x 8.6	28
75 x 10.3	20
90 x 12.3	12
110 x 15.1	8
125 x 17.1	4
160 x 21.9	4
● 200 x 27.4	1
● 250 x 34.2	1



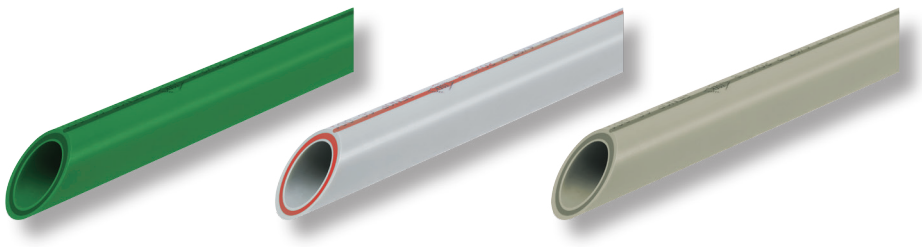
COLD WATER PIPE PN 10 (SDR 11)

OD x THICKNESS mm	m/PACK
20 x 2.3	100
25 x 2.3	100
32 x 2,9	100
40 x 3.7	60
50 x 4.6	40
63 x 5.8	28
75 x 6.8	20
90 x 8.2	12
110 x 10.0	8
125 x 11,4	4
160 x 14,6	4
● 200 x 18.2	1
● 250 x 22.7	1



COMPOSITE HOT & COLD WATER PIPE (SDR 6) PN 25

OD x THICKNESS mm	m/PACK
20 x 3.4	100
25 x 4.2	100
32 x 5.4	60
40 x 6.7	40
50 x 8.3	20
63 x 10.5	20
75 x 12.5	12
90 x 15.0	12
110 x 18.3	8
● 160 x 26.6	4
● 200 x 33.2	1

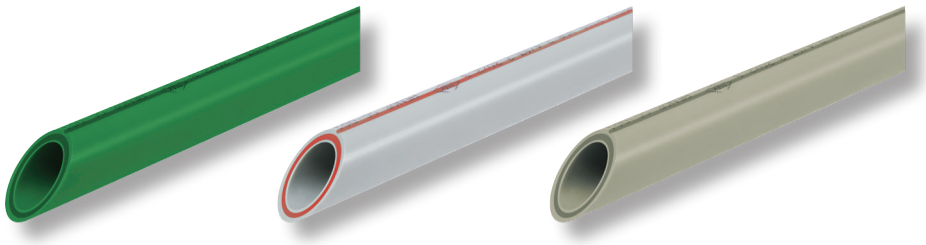


● Require minimum order quantity or stock availability.

3. PRODUCT RANGE

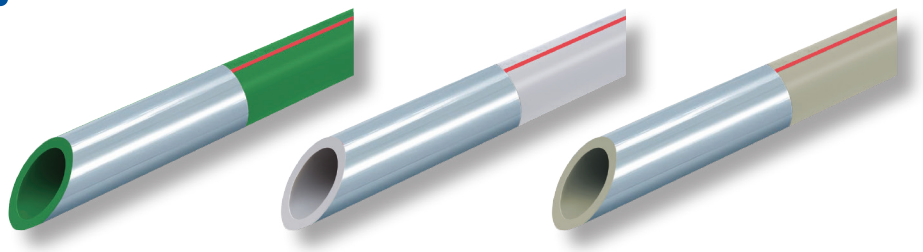
COMPOSITE HOT & COLD WATER PIPE (SDR 7.4) PN 20

OD x THICKNESS mm	m/PACK
20 x 2.8	100
25 x 3.5	100
32 x 4.4	60
40 x 5.5	40
50 x 6.9	20
63 x 8.6	20
75 x 10.3	12
90 x 12.3	12
110 x 15.1	8
● 160 x 21.9	4
● 200 x 27.4	1



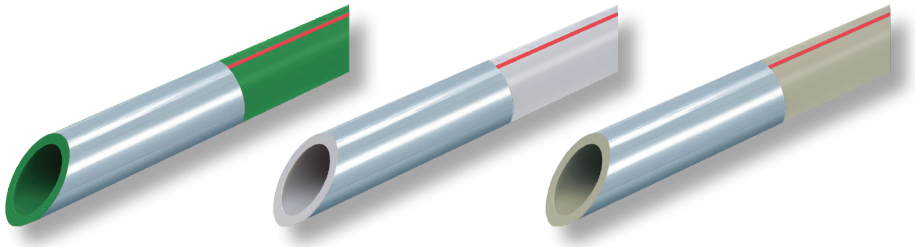
ALUMINIUM HOT & COLD WATER PIPE (SDR 5)

OD x THICKNESS mm	m/PACK
20 x 3,4	100
25 x 4,2	100
32 x 5,4	60
40 x 6,7	60
50 x 8,3	40
63 x 10,5	28
75 x 12,5	20
90 x 15,0	12
110 x 18,3	8



ALUMINIUM HOT & COLD WATER PIPE (SDR 6)

OD x THICKNESS mm	m/PACK
20 x 2.8	100
25 x 3.5	100
32 x 4.4	60
40 x 5.5	60
50 x 6.9	40
63 x 8.6	28
75 x 10.3	20
90 x 12.3	12
110 x 15.1	8



SOCKET

OD x THICKNESS mm	PIECES/ PACK
20	200
25	120
32	105
40	60
50	30
63	12
75	12
90	5
110	4
● 125	1
● 160	1

● Require minimum order quantity or stock availability.

3. PRODUCT RANGE

90° ELBOW

OD x THICKNESS mm	PIECES/ PACK
20	150
25	100
32	50
40	35
50	20
63	8
75	5
90	2
110	2
● 125	1
● 160	1

45° ELBOW

SIZE mm	PIECES/ PACK
20	150
25	80
32	60
40	35
50	20
63	8
75	5
90	2
110	2
● 125	1
● 160	1

TEE PART

SIZE mm	PIECES/ PACK
20	100
25	60
32	48
40	30
50	12
63	6
75	4
90	2
110	1
● 125	1
● 160	1

UNEQUAL TEE

SIZE mm	PIECES/ PACK
20 x 25 x 20	75
25 x 20 x 20	75
25 x 20 x 25	75
25 x 25 x 20	75
32 x 20 x 20	45
32 x 20 x 25	45
32 x 20 x 32	40
32 x 25 x 20	40
32 x 25 x 32	48
40 x 20 x 40	30
40 x 25 x 32	30
40 x 25 x 40	30
40 x 32 x 25	30
40 x 32 x 40	30
50 x 20 x 50	12
50 x 25 x 50	12
50 x 32 x 50	12
50 x 40 x 50	12

SIZE mm	PIECES/ PACK
63 x 20 x 63	6
63 x 25 x 63	6
63 x 32 x 63	6
63 x 40 x 63	6
63 x 50 x 63	6
75 x 20 x 75	4
75 x 25 x 75	4
75 x 32 x 75	4
75 x 40 x 75	4
75 x 50 x 75	4
75 x 63 x 75	4
90 x 40 x 90	2
90 x 50 x 90	2
90 x 63 x 90	2
90 x 75 x 90	2
110 x 50 x 110	1
110 x 63 x 110	1
110 x 75 x 110	1
110 x 90 x 110	1
● 125 x 110 x 125	1
● 160 x 110 x 160	1

● Require minimum order quantity or stock availability.

3. PRODUCT RANGE

CROSS

SIZE mm	PIECES/ PACK
20	60
25	40
32	32
40	20

REDUCER

SIZE mm	SOCKET SIZE TO BE USED mm	SIZE mm	SOCKET SIZE TO BE USED mm
25/20	250	75/40	16
32/20	180	75/50	16
32/25	120	75/63	16
40/20	100	90/50	12
40/25	100	90/63	12
40/32	105	90/75	12
50/20	60	110/75	6
50/25	60	110/90	6
50/32	60	● 125/110	1
50/40	60	● 160/110	1
63/20	48	● 160/125	1
63/25	40		
63/32	40		
63/40	30		
63/50	36		

ELBOW WITH TAIL 45°

SIZE mm	PIECES/ PACK
20	200
25	120
32	60

ELBOW WITH TAIL 90°

SIZE mm	PIECES/ PACK
20	200
25	120
32	60

CAP

SIZE mm	PIECES/ PACK
20	300
25	200
32	100
40	60
50	40
63	24
75	10
90	4
110	4
● 125	1
● 160	1

● Require minimum order quantity or stock availability.

3. PRODUCT RANGE

THREADED CAP

SIZE mm	PIECES/ PACK
20	300
25	300
32	150

PP-R UNION

SIZE mm	PIECES/ PACK
20	50
25	40
32	20
40	15
50	10
63	5
75	2
90	1
110	1

FLANGE

SIZE mm	PIECES/ PACK
20	200
25	150
32	100
40	60
50	30
63	18
75	12
90	6
110	6
● 125	1
● 160	1

ADAPTOR FEMALE

SIZE mm	PIECES/ PACK
20 x 1/2"	120
20 x 3/4"	80
25 x 1/2"	60
25 x 3/4"	60

ADAPTOR MALE

SIZE mm	PIECES/ PACK
20 x 1/2"	80
20 x 3/4"	60
25 x 1/2"	60
25 x 3/4"	60

● Require minimum order quantity or stock availability.

3. PRODUCT RANGE

WALL CONNECTION ELBOW

SIZE mm	PIECES/ PACK
20 x 1/2"	60
25 x 1/2"	60

ELBOW FEMALE

SIZE mm	PIECES/ PACK
20 x 1/2"	80
25 x 1/2"	60
25 x 3/4"	60
32 x 1"	20

ELBOW MALE

SIZE mm	PIECES/ PACK
20 x 1/2"	60
25 x 1/2"	40
25 x 3/4"	40
32 x 1"	16

TEE PART FEMALE

SIZE mm	PIECES/ PACK
20 x 1/2" x 20	90
20 x 3/4" x 20	60
25 x 1/2" x 25	60
25 x 3/4" x 25	50
32 x 3/4" x 32	32
32 x 1/2" x 32	32
32 x 1" x 32	24

TEE PART MALE

SIZE mm	PIECES/ PACK
20 x 1/2" x 20	75
25 x 1/2" x 25	60
25 x 3/4" x 25	48
32 x 1/2" x 32	32
32 x 1" x 32	24

HEX FEMALE ADAPTOR

SIZE mm	PIECES/ PACK
32 x 1	40
40 x 1 ¼ "	20
50 x 1 ½"	16
63 x 2"	10
75 x 2 ½"	5
● 90 x 3	3
● 110 x 4	2

● Require minimum order quantity or stock availability.

3. PRODUCT RANGE

HEX MALE ADAPTOR

SIZE mm	PIECES/ PACK
32x1"	24
40 x 1 ¼"	12
50 x 1 ½"	12
63 x 2"	10
75 x 2 ½"	8
● 90 x 3	2
● 110 x 4	2

UNION FEMALE

SIZE mm	PIECES/ PACK
20 x 1/2"	160
25 x 3/4"	90
32 x 1"	62
40 x 1 ¼"	30

UNION MALE

SIZE mm	PIECES/ PACK
20 x 1/2"	60
25 x 3/4"	40
32 x 1"	24
40 x 1 1/4"	16

ADAPTOR WITH NUT

SIZE mm	PIECES/ PACK
20 x 1/2"	150
20 x 3/4"	100
25 x 3/4"	100
25 x 1/2"	100
25 x 1"	80
32 x 1"	80

ELBOW WITH NUT

SIZE mm	PIECES/ PACK
20 x 1/2"	150
25 x 3/4"	100
25 x 1/2"	100
32 x 1"	80

Y-FILTER WITH METAL PLUG

SIZE mm	PIECES/ PACK
20	80
25	60

● Require minimum order quantity or stock availability.

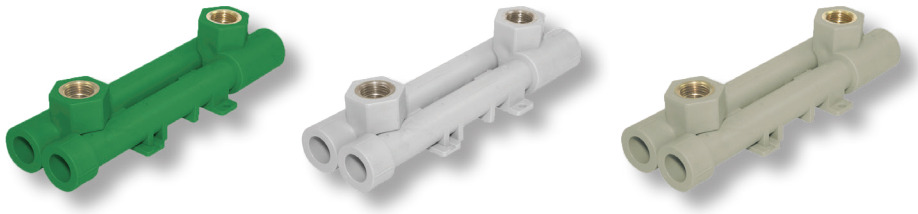
3. PRODUCT RANGE

DOUBLE STABLE UNDERPLASTER ELBOW

SIZE mm	PIECES/ PACK
20 x 1/2"	60
25 x 1/2"	60

ADJUSTABLE UNDERPLASTER ELBOW

SIZE mm	PIECES/ PACK
20 x1/2"	36
25 x 1/2"	36



CLIPS

SIZE mm	PIECES/ PACK
20	300
25	200
32	150
40	100
50	50
63	25
75	20
90	10
110	10

DOUBLE CLIPS

SIZE mm	PIECES/ PACK
20	125
25	125

PIPE BRIDGE

SIZE mm	PIECES/ PACK
20	50
25	40
32	25

BRIDGE WITH SOCKET

SIZE mm	PIECES/ PACK
20	50
25	40
32	25

● Require minimum order quantity or stock availability.

3. PRODUCT RANGE

SHORT BRIDGE

SIZE mm	PIECES/ PACK
20	100
25	70

RADIATOR VALVE STRAIGHT

SIZE mm	PIECES/ PACK
20 x 1/2"	50
25 x 3/4"	50

RADIATOR VALVE ELBOW

SIZE mm	PIECES/ PACK
20 x 1/2"	50
25 x 3/4"	40

CHROMIUM VALVE

SIZE mm	PIECES/ PACK
20 x 1/2"	60
25 x 3/4"	40
32 x 1"	24
40 x 1 1/4"	16

CHROMIUM VALVE-LONG

SIZE mm	PIECES/ PACK
20 x 1/2"	20
25 x 3/4"	20
32 x 1"	16

VALVE

SIZE mm	PIECES/ PACK
20 x 1/2"	24
25 x 3/4"	20
32 x 1"	16

● Require minimum order quantity or stock availability.

3. PRODUCT RANGE

PP-R UNION BALL VALVE (COLD WATER)

SIZE mm	PIECES/ PACK
20	12
25	12
32	12
40	12
50	12
63	12
75	4
90	1
110	1

PP-R BALL VALVE

SIZE mm	PIECES/ PACK
20 x 1/2"	40
25 x 3/4"	32
32 x 1"	18
40 x 1 ¼"	6
50 x 1 ½"	4
63 x 2"	2
75 x 2 ½"	2

WELDING MACHINE SET

TYPE	PIECES
Classic Welding Set (20-40 mm)	1
Maxi Set (50-110 mm)	1

WELDING ADAPTOR

SIZE mm	PIECES/ PACK
20	50
25	50
32	50
40	40
50	30
63	20
75	10
90	4
110	2
125	1

ALUMINIUM FOIL SHAVER

SIZE mm	PIECES/ PACK
20 - 25	1
32 - 40	1
40 - 50	1
63 - 75	1
75 - 90	1
90 - 110	1

CUTTERS

SIZE mm	PIECES
20-40	1
40-63	1

● Require minimum order quantity or stock availability.

3. PRODUCT RANGE

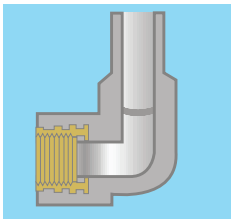
Novatherm PP-R fittings are manufactured in compliance with PN 25 rating. All the range of our fittings can be used safely in PN 20 and PN 25 water application system.

- There is no PN marking on our fittings.
- Our fitting production is according to S2,5 series.
- The wall thickness as follows;

Nominal Size DN/OD	Nominal Outside Diameter	Mean Outside Diameter		Pipe Series						
				S 8 [a]	S 6,3 [a]	S 5	S 4 [a]	S 3,2	S 2,5	S 2
		$d_{em,min}$	$d_{em,max}$	Wall Thicknesses e_{min} and e_n						
12	12	12	12,3	1,8	1,8	1,8	1,8	1,8	2,0	2,4
16	16	16	16,3	1,8	1,8	1,8	1,8	2,2	2,7	3,3
20	20	20	20,3	1,8	1,8	1,9	2,3	2,8	3,4	4,1
25	25	25	25,3	1,8	1,9	2,3	2,8	3,5	4,2	5,1
32	32	32	32,3	1,9	2,4	2,9	3,6	4,4	5,4	6,5
40	40	40	40,4	2,4	3,0	3,7	4,5	5,5	6,7	8,1
50	50	50	50,5	3,0	3,7	4,6	5,6	6,9	8,3	10,1
63	63	63	63,6	3,8	4,7	5,8	7,1	8,6	10,5	12,7
75	75	75	75,7	4,5	5,6	6,8	8,4	10,3	12,5	15,1
90	90	90	90,9	5,4	6,7	8,2	10,1	12,3	15,0	18,1
110	110	110	111	6,6	8,1	10,0	12,3	15,1	18,3	22,1
120	120	120	126,2	7,4	9,2	11,4	14,0	17,1	20,8	25,1
140	140	140	141,3	8,3	10,3	12,7	15,7	19,2	23,3	28,1
160	160	160	161,5	9,5	11,8	14,6	17,9	21,9	26,6	32,1

4. JOINTS, FUSION & REPAIRS

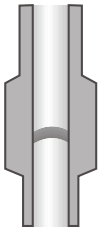
4.1 Homogeneous Joint



The result of a socket fusion or electrofusion joint is a homogeneous joint. This is one of the biggest advantages of using NOVATHERM system:

- 100% leak-proof;
- No maintenance;
- Visual inspection possible;
- Perfect for concealed installation that needs corrosion-free joining system.

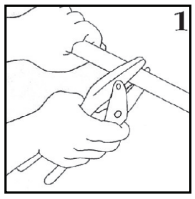
4.2 Fusion Tools



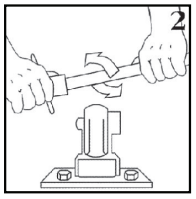
- Socket Fusion Welding Tool
- Desktop Welding Machine
- Electrofusion Welding Kit

Please refer to the operating manuals of various welding tools.

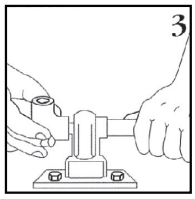
4.3 Four-Step Fusion Process



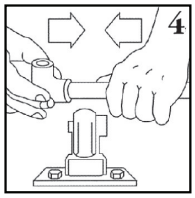
Step 1 Cut pipe to the required length using a cutter, mark the welding depth on the pipe, ensure that the indicator light on the welding tool signals that the tool is hot enough (260°C) for welding.



Step 2 The tip of the pipe to be welded is shaved by a special NOVATHERM shaver to remove outside PP-R layer and aluminium foil. (This step is applicable only to stable pipes with aluminium foil.)



Step 3 Push the pipe and fitting into the welding adaptors, applying even strength at both ends. Do not twist or turn the pipe and fitting while pushing. Wait until heating time is reached. See the table on section 4.5 for necessary information.



Step 4 When the welding time is reached, remove both pipe and fittings together, again without twisting or turning while pulling out of the welding adaptors. Almost immediately, push both the pipe and the fitting together until the depth is reached. It is possible to adjust the joints for more than 5 degrees during this time. Thus the fusion process is completed.

4.4 Welding Depth, Heating, Welding and Cooling Time

The table provides the necessary information for a good welding joint for various NOVATHERM pipe and fitting sizes.

Pipe Diameter (mm)	Welding Depth (mm)	Heating Time (sec)	Welding Time (sec)	Cooling Time (min)
20	14.0	5	4	2
25	15.0	7	4	2
32	16.5	8	6	4
40	18.0	12	6	4
50	20.0	18	6	4
63	24.0	24	8	6
75	26.0	30	8	8
90	29.0	40	8	8
110	32.5	50	10	8

Note: Heating time starts when both pipe and fitting are pushed into correct depth. Welding time begins when joints are connected. Cooling time is the time taken for the joint to be completely cured. Never try to reduce cooling time by pouring water or by other means.

4. JOINTS, FUSION & REPAIRS

4.5 Pipe Repair

Pipe repair may be carried out by one of the following methods depending on the following:

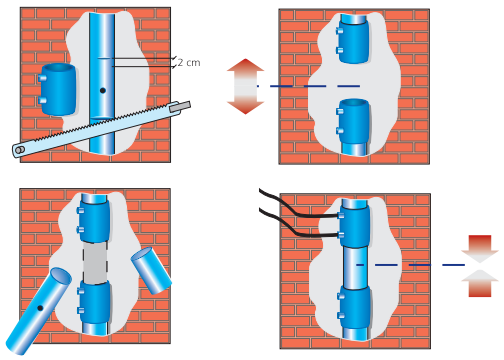
Pipe with nail holes (not concealed)

If the damaged part of the pipe is not concealed yet (before the pressure test is conducted) the recommended procedure is to cut out that part and replace it by a new part through normal welding of a socket.

Pipe concealed with two through holes

Using Electrofusion Fittings (see pictures on the right)

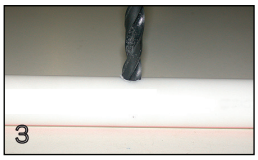
- Cut the damaged pipe perpendicularly, by a length equal to that of the corresponding electric socket plus 2 cm.
- Remove the section of the damaged pipe.
- Carefully clean the surfaces of the two pipe sections to be joined, using sandpaper and solvent liquid and wait until the parts of the pipe are perfectly dry.
- Remove the inner stops from 2 electric sockets.
- Fully insert the electric sockets into the pipe sections.
- Cut a pipe section having the same diameter and length as the damaged one.
- Fit it into the place of the previous one. Make the 2 electric sockets slide towards the middle of the new pipe piece, by a section equal to the half the length of the socket.
- Weld the socket using an electrofusion welding kit.



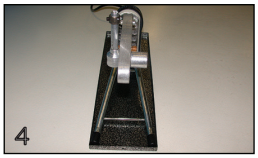
Pipe with one nail hole (concealed)

With a pipe repairing kit you can easily repair holes (max. 10 mm diameter) on the surface of a pipe. This system makes the repairing process easier especially for the pipes installed into places where it is difficult to reach. Only a welding kit, a pipe repairing socket, a pipe repairing stick and a drill with a 6 mm or 10 mm tip is needed.

Insert the repairing socket into the welding tool.

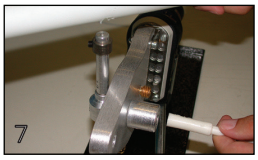


If the hole diameter on the pipe surface is equal to or smaller than 5 mm expand it with a 6 mm tip. If it is equal to or smaller than 9 mm use a 10 mm tip.

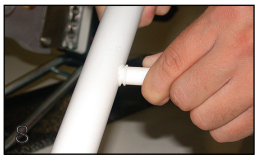


Insert the repairing socket into the welding tool.

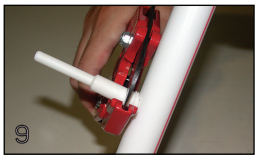
Insert the hole to be repaired into the male part of the socket to heat the plastic around the hole and insert the repairing stick to the female part of the socket to heat it.



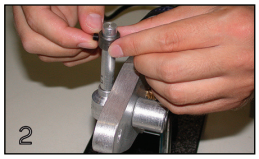
Adhere to heating, welding and cooling periods for a good welding joint. Increase the periods by 50% when the air temperature is below +5°C.



Insert the pipe repairing stick without exceeding the pipe's wall thickness.



Cut the remaining part after the stick cools down.



Adjust the pipe clip on the socket according to the wall thickness of the pipe to be repaired, It is adjusted by adding a tolerance of +0.1 mm to the wall thickness and moving the rings on the socket. The related data are given below.

NOVATHERM Pipe	Other Diameter (mm)	Wall Thickness (mm)	Depth of Socket Clip on the Socket (mm)
SDR 11	20	2.3	2.4
SDR 11	25	2.3	2.4
SDR 11	32	2.9	3.0
SDR 11	40	3.7	3.8
SDR 11	50	4.6	4.7
SDR 11	63	5.8	5.9
SDR 11	75	6.8	6.9
SDR 11	90	8.2	8.3
SDR 11	110	10.0	10.1
SDR 6	20	3.4	3.5
SDR 6	25	4.2	4.3
SDR 6	32	5.4	5.5
SDR 6	40	6.7	6.8
SDR 6	50	8.3	8.4
SDR 6	63	10.5	10.6
SDR 6	75	12.5	12.6
SDR 6	90	15.0	15.1
SDR 6	110	18.3	18.4
SDR 7.4	20	2.8	2.9
SDR 7.4	25	3.5	3.6
SDR 7.4	32	4.4	4.4
SDR 7.4	40	5.5	5.6
SDR 7.4	50	6.9	7.0
SDR 7.4	63	8.6	8.7
SDR 7.4	75	10.3	10.4
SDR 7.4	90	12.3	12.4
SDR 7.4	110	15.1	15.2

After an hour later, the pipe should be subjected to a pressure test with its normal operating pressure to see whether it will leak. If the pressure test is successful the repair is completed.

5. CHEMICAL RESISTANCE

5.1 General

NOVATHERM has high resistance to various acids and chlorides due to the chemical properties of polypropylene. As such, NOVATHERM is highly suitable for transportation of hard or soft water or potable water with consumable amount of chlorine, fluids, DI water or industrial chemicals.

5.2 Chemical Resistance

The following chart is given for our customers to have an idea for the chemical resistance of NOVATHERM Pipes and Fittings. The customers are strictly recommended to consult our technical department 'info@novatherm.com' before the design stage of the project.

G: Good S: Satisfactory US: Unsatisfactory

Reagent	Concentration	Temperature		
		20°C	60°C	100°C
Acetic anhydride	100%	G	-	-
Acetic di-trichloroacetic	sol.	G	-	-
Acetic acid	up to 40%	G	G	-
Acetic acid	50%	G	G	S
Acetic glacial acid	over 96%	G	S	US
Acetone	100%	G	S	-
Acetophenone anhydride	100%	G	S	-
Acrylonitrile	100%	G	-	-
Air		G	G	G
Almond oil		G	-	-
Alum	sol.	G	-	-
Ammonia (gas)	100%	G	-	-
Ammonia (saturated in water)		G	G	-
Ammonia liquor	up to 30%	G	G	-
Ammonium acetate	sat. sol.	G	G	-
Ammonium bicarbonate	sat. sol	G	G	-
Ammonium chloride	sat. sol.	G	G	-
Ammonium fluoride	sol	G	G	-
Ammonium hydroxide	sol.	G	-	-
Ammonium metaphosphate	sat. sol.	G	G	G
Ammonium nitrate	sat. sol.	G	G	G
Ammonium phosphate	sat. sol.	G	G	-
Ammonium sulphate	sat. sol.	G	G	G
Amyl acetate	100%	G	-	-
Amyl alcohol	100%	G	G	G
Aniline	100%	G	-	-
Anisole	100%	G	-	-
Apple juice		G	G	-
Barium carbonate	sat. sol	G	G	G
Barium chloride	sat. sol	G	G	G
Barium hydroxide	sat. sol	G	G	G
Barium sulphate	sat. sol	G	G	G
Benzoic acid	sat. sol.	G	-	-
Benzoyl acid	100%	G	G	-
Benzyl alcohol	100%	G	S	-
Borax sol.		G	G	-
Boric acid	sat. sol.	G	G	-
Butane	100%	G	G	-
Butanol	100%	G	S	S
Butyl glycol	100%	G	-	-
Butyl phenol cold	sat. sol.	G	-	-
Butyl phthalate	100%	G	S	S
Calcium carbonate	sat. sol.	G	G	G
Calcium chloride	sat. sol.	G	G	G
Calcium hydroxide	sat. sol	G	G	-
Calcium nitrate	sat. sol.	G	G	-
Carbon dioxide gaseous (dry)	100%	G	G	-
Carbon dioxide gaseous (wet)		G	G	-
Carbon disulphide	100%	US	US	US

Reagent	Concentration	Temperature		
		20°C	60°C	100°C
Carbon tetrachloride	100%	US	US	US
Castor-oil	100%	G	G	-
Chloroethanol (2-Chloroethanol)	100%	G	-	-
Chrome alum	sat. sol.	G	G	-
Chromic acid	up to 40%	S	S	US
Citric acid	10%	G	G	G
Coconut-oil		G	-	-
Corn-oil		G	S	-
Cotton-oil		G	S	-
Cresol	over 90%	G	-	-
Cupric chloride	sat. sol.	G	G	-
Cupric nitrate	30%	G	G	G
Cupric sulphate	sat. sol.	G	G	-
Cyclohexane	100%	G	-	-
Cyclohexanol	100%	G	S	-
Dextrin	sol.	G	G	-
Dextrose	sol.	G	G	-
Dibutyl phthalate	100%	G	S	US
Dichloroacetic acid	100%	S	-	-
Dichloroethylene	100%	S	-	-
Diethanolamine	100%	G	-	-
Diethyl ether	100%	G	S	-
Diethylene glycol	100%	G	G	-
Diglycolic acid	sat. sol.	G	-	-
Diisooctyl phthalate	100%	G	S	-
Dimethylamine	100%	G	-	-
Dimethylformamide	100%	G	G	-
Dioctyl phthalate	100%	S	S	-
Dioxan	100%	S	S	-
Ethanolamine	100%	G	-	-
Ethyl alcohol (ethanol)	up to 95%	G	G	-
Ethylene chloride	100%	US	US	-
Ethylene glycol	100%	G	G	G
Formaldehyde	40%	G	-	-
Formic acid	10%	G	G	S
Formic acid	85%	S	US	US
Formic acid (anhydrous)	100%	S	S	S
Fructose	sol.	G	G	G
Fruit juice		G	G	G
Glucose	20%	G	G	G
Glycerine	100%	G	G	G
Glycolic acid	30%	G	-	-
Hexane	100%	S	S	-
Hydrobromic acid	up to 48%	G	S	US
Hydrochloric acid	2%	G	G	G
Hydrochloric acid	10%	G	G	-
Hydrochloric acid	30%	G	S	S
Hydrochloric acid	35%	G	-	-
Hydrochloric acid (dry gas)	100%	G	G	-

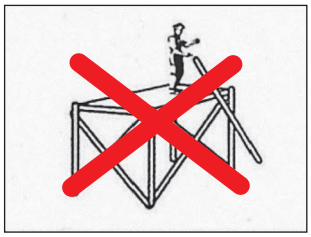
5. CHEMICAL RESISTANCE

G: Good S: Satisfactory US: Unsatisfactory

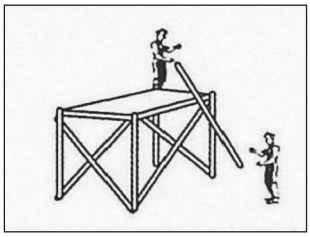
Reagent	Concentration	Temperature		
		20°C	60°C	100°C
Hydrofluoric acid	dil. sol.	G	-	-
Hydrofluoric acid	40%	G	-	-
Hydrogen	100%	G	-	-
Hydrogen peroxide	up to 10%	G	-	-
Hydrogen peroxide	up to 30%	G	-	-
Hydrogen sulphide (dry gas)	100%	G	G	-
Iodine (alcoholic solution)		G	-	-
Isopropyl alcohol	100%	G	G	G
Isopropyl ether	100%	S	-	-
Jelly	100%	G	G	-
Lactic acid	up to 90%	G	G	-
Lanolin		G	S	-
Linseed-oil		G	G	-
Magnesium carbonate	sat. sol.	G	G	G
Magnesium chloride	sat. sol.	G	G	-
Mercurous nitrate	sol.	G	G	-
Mercury	100%	G	G	-
Methyl acetate	100%	G	-	-
Methyl alcohol	5%	G	S	S
Methyl ethyl ketone	100%	G	-	-
Methylamine	up to 32%	G	-	-
Milk		G	G	G
Monochloroacetic acid	over 85%	G	G	-
Naphtha		G	US	US
Nickel chloride	sat. sol.	G	G	-
Nickel nitrate	sat. sol	G	G	-
Nickel sulphate	sat. sol.	G	G	-
Nitric acid	10%	G	US	US
Nitric acid	30%	S	-	-
Nitric acid,fuming		US	US	US
Nitrobenzene	100%	G	S	-
Olive-oil		G	G	S
Oxalic acid	sat. sol.	G	S	US
Oxygen	100%	G	-	-
Peanut-oil		G	G	-
Peppermint-oil		G	-	-
Perchloric acid	2N	G	-	-
Petroleum-ether (ligroin)		S	S	-
Phenol	5%	G	G	-
Phenol	90%	G	-	-
Phosphoric acid	up to 85%	G	G	G
Phosphorus oxychloride	100%	S	-	-
Picric acid	sat. sol.	G	-	-
Potassium bicarbonate	sat. sol	G	G	-
Potassium borate	sat. sol.	G	G	-
Potassium bromate	up to 10%	G	G	-
Potassium bromide	sat. sol.	G	G	-
Potassium carbonate	sat. sol	G	G	-
Potassium chlorate	sat. sol	G	G	-
Potassium chloride	sat. sol	G	G	-
Potassium chromate	sat. sol.	G	G	-
Potassium cyanide	sol.	G	-	-
Potassium fluoride	sat. sol.	G	G	-
Potassium hydroxide	up to 50%	G	G	G
Potassium iodide	sat. sol.	G	-	-
Potassium nitrate	sat. sol.	G	G	-
Potassium perchlorate	10%	G	G	-
Potassium permanganate	2N	G	-	-
Potassium persulfate	V	G	G	-
Potassium sulfate	V	G	G	-

Reagent	Concentration	Temperature		
		20°C	60°C	100°C
Propane	100%	G	-	-
Propionic acid	over 50%	G	-	-
Pyridine	100%	S	-	-
Silicone-oil		G	G	G
Silver	sat. sol.	G	G	G
Sodium acetate	sat. sol.	G	G	G
Sodium benzoate	35%	G	S	-
Sodium bicarbonate	sat. sol.	G	G	G
Sodium bisulfite	sol.	G	G	-
Sodium bisulphate	sat. sol	G	G	-
Sodium carbonate	up to 50%	G	G	S
Sodium chlorate	sat. sol.	G	-	-
Sodium chloride	10%	G	G	G
Sodium chlorite	2%	G	US	US
Sodium chlorite	20%	G	S	US
Sodium dichromate	sat. sol.	G	G	G
Sodium hydroxide	1%	G	G	G
Sodium hydroxide	up to 60%	G	G	G
Sodium hypochlorite	5%	G	-	-
Sodium hypochlorite	10%	G	-	-
Sodium hypochlorite	20%	S	-	-
Sodium metaphosphate	sol.	G	-	-
Sodium nitrate	sat. sol.	G	G	-
Sodium orthophosphate	sat. sol.	G	G	-
Sodium perborate	sat. sol.	G	-	-
Sodium silicate	sol.	G	G	-
Sodium sulfide	sat. sol.	G	-	-
Sodium sulfite	40%	G	G	G
Sodium sulphate	sat. sol.	G	G	-
Sodium thiosulphate	sat. sol.	G	-	-
Soybean-oil		G	S	-
Stannic chloride	sat. sol.	G	G	-
Succinic acid	sat. sol.	G	G	-
Sulphur dioxide (dry gas)	100%	G	-	-
Sulphur dioxide (wet gas)	100%	G	-	-
Sulphuric acid	up to 10%	G	G	G
Sulphuric acid	100%	G	G	-
Sulphuric acid	50%	G	S	G
Sulphuric acid	96%	G	S	US
Sulphurous acid	sol.	G	-	-
Tartaric acid	10%	G	G	-
Thiophene	100%	G	S	-
Trichloroacetic acid	up to 50%	G	G	-
Triethanolamine	sat. sol.	G	-	-
Urea	sat. sol.	G	-	-
Vinegar		G	G	-
Water (brackish)		G	G	G
Water (distilled)	100%	G	G	G
Water (drinkable)		G	G	G
Water (mineral)		G	G	G
Water (sea water)		G	G	G

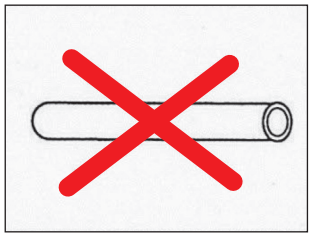
6. HANDLING



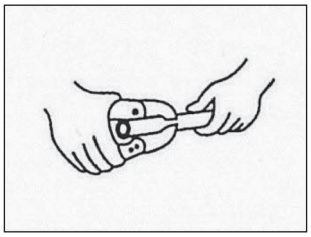
Avoid knocking or over - pressing to the end of pipes.



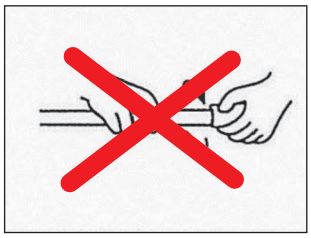
Handle carefully.



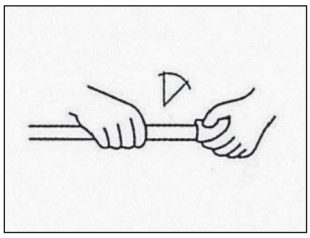
Damaged or end-spoiled pipes should not be used in installation.



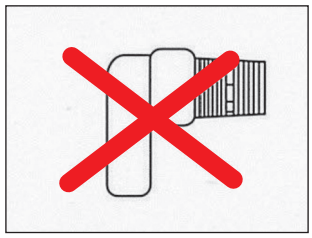
Cut the pipe only with sharp tool.



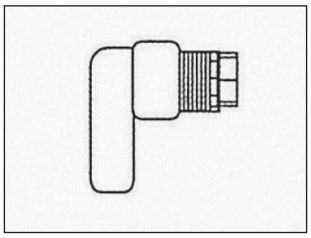
Do not forcibly move pipes or fittings after joining.



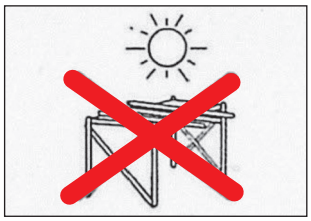
Welded piece can move max, to 5° to stay in proper shape.



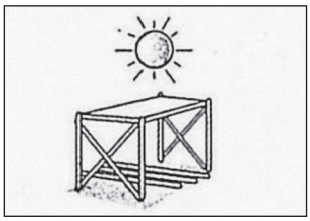
Do not use conical threaded fittings.



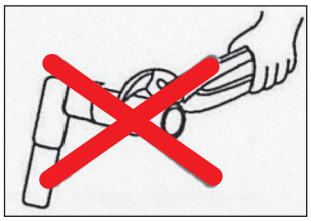
Only use straight threaded metal fittings and do not overtighten.



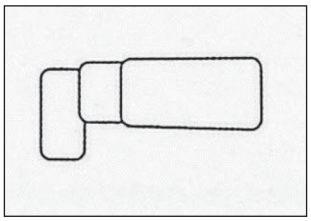
Do not expose pipes and fittings to UV-radiation for a long period.



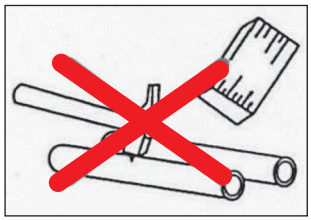
Keep away from sunshine and rain.



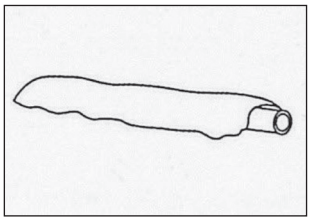
Do not use metal tools which may damage installed material.



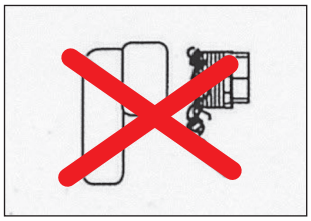
Use plastic tool for fixing.



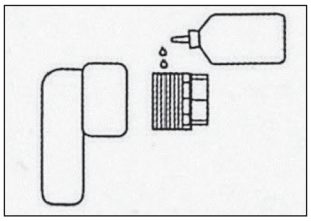
Protect your installation from accidental damages at building sites.



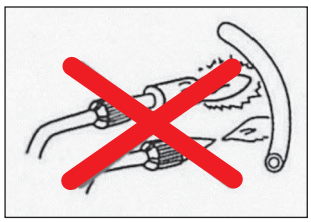
Protect the pipes by covering.



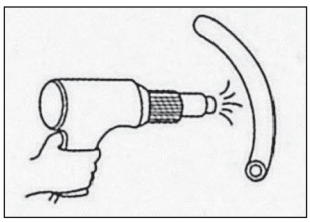
It is advisable to use teflon tape or adhesive in proper quantity when fixing the metal parts of fittings. If hemp is used, avoid using too much of hemp when fixing the fittings



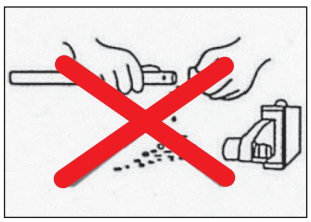
Besides hemp you can use teflon or adhesive in the proper quantity.



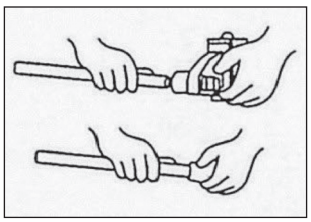
Do not use open flame for shaping and/or bending a pipe as uncontrolled flame heat can seriously damage the pipe. It is advisable to use hot air for bending with highest bending temperature up to 140°C.



The highest bending temperature is 140°C.



Welding process may properly be applied only on clean pipes and fittings.



Use clean material for connection.

7. CONVERSION TABLE

Quantity	SI Unit	Alternate SI Unit	Conversion Factor K	Conversion Factor 1/K	U.S. Unit	Conversion Factor K	Conversion Factor 1/K
Length	m		1	1	in (inch) ft (foot) mi (mile)	39.370 3.281 $6.214x10^{-2}$	$2.54x10^{-2}$ 0.305 1609.344
Area	m^2	hectare	10^4	10^{-4}	in^2 ft^2 mi^2	1550 10.764 $3.861x10^{-7}$	$6.452x10^{-4}$ 0.093 $2.590x10^6$
Volume	m^3	dm^3= l	1000	0.001	ft^3 gal (gallon) gal (gallon) UK	35.315 264.172 219.969	0.0283 $3.785x10^{-3}$ $4.546x10^{-3}$
Mass	kg	ton	1000	0.001	ibm (pound) gr (grain) oz (ounce)	2.205 15432.4 35.274	0.454 $6.479x10^{-5}$ $2.835x10^{-2}$
Force	N	kgf dyn	0.102 10^5	9.807 10^{-5}	lbf	0.225	4.448
Pressure	N/mm^2 =MPa	kgf/mm^2 bar dyn / cm^2	0.102 10 10^7	9.807 0.1 10^{-7}	psi (lbf/in^{-2}) mmHg=torr(0°)	145 7500.62	$6.895x10^{-3}$ $1.333x10^{-4}$
Energy	J	kgf-m erg	0.102 10^7	9.807 10^{-7}	lbf-ft cal BTU	0.738 0.239 $9.478x10^{-4}$	1.356 4.184 1055.06
Power	W	kcal/hr	0.860	1.162	BTU/hr	3.415	0.293
Temperature (absolute difference)	K K,°C				°R (Rankine)	1.8 1.8	0.555 0.555
Viscosity (dynamic)	Pa s = N s/m^2	$kgf s/m^2$ cP	0.102 1000	9.807 0.001	lbf s/ft^2	0.0209	47.880
Viscosity (kinematic)	m^2/s				ft^2/s	10.764	0.093
Density	kg/m^3	g/cm^3	0.001	1000	lb/ft^3	0.0624	16.018
Thermal Conductivity	W/m K	kcal/m h°C	0.860	1.162	BTU in/ft^2 hr °F BTU/ft^2 hr °F	6.933 0.578	0.144 1.731
Specific Entropy	kJ/kg K	kcal/kg°C	$2.390x\ 10^{-1}$	4.184	BTU/lbm °R	$2.388x10^{-1}$	4.187

8. DISCLAIMER

NOVATHERM accepts no responsibility or liability whatsoever with regard to the any failure, defect or damage caused by situations and events including, but not limited to, the following:

- Misuse, abuse, neglect or improper handling or storage.
- Improper installation or use of accessories not in strict adherence to NOVATHERM's below mentioned written general instructions.
- Defects in other manufacturers' components incorporated during installation.
- Fire, earthquake, flood, lightning, hurricane, tornado or other casualty or acts of God.
- Exposure to chemicals and many other local influences over which NOVATHERM has no control.
- Any other cause not involving inherent manufacturing defects in the pipes and fittings supplied by NOVATHERM

The pipes and fittings are not warranted against color discoloration or other damage caused by normal weathering resulting from exposure to the elements. Normal weathering is defined as exposure to sunlight and extremes of weather and atmosphere which will cause any colored surface to gradually fade or accumulate stains.

NOVATHERM shall have sole discretion to determine whether the pipe and fittings are suffering from normal weathering, which conclusion shall be based on reasonable criteria. In the event the material weathers to a degree which is determined by NOVATHERM to be beyond normal, then NOVATHERM shall either repair or replace, at its option.
NOVATHERM reserves the right to discontinue or modify any of its products.

9. GENERAL INSTRUCTIONS

9.1 Transport & Usage

- Store NOVATHERM sheltered from sun and rain. Do not expose to UV radiation for a long period
- Handle NOVATHERM with care at low temperatures. Do not store at temperatures below 0°C. Impacts can form cracks on pipes.
- Protect exposed pipes from damage, do not subject the pipe to heavy shocks or falling stones.

9. GENERAL INSTRUCTIONS

9.2 Installation

- Install the NOVATHERM pipes and fittings according to the pressure, temperature and expansion limitations indicated NOVATHERM's Technical Catalogue or on www.novatherm.com.
- Do not use pipes that are damaged or cracked at the interfaces. Use only special pipe cutter to shorten the pipe.
- Install only clean material; do not bind up contaminated pipes and fittings. Before welding, be sure that both pipe and fitting surfaces should be removed from chemicals and paint. If it is required to paint the installation after welding, insulate NOVATHERM pipeline to prevent the passage of chemicals inside the paint, which will cause contamination of water or affect the service life of the installation, through the pipe wall. NOVATHERM does not warrant any responsibility regarding the exposure to chemicals and paints. The customers are strictly recommended to consult our technical department before the design stage of the project.
- Use only fittings with parallel threads, do not use conical threads and do not tighten too firmly.
- Do not use metal plugs as connectors, prefer using plastic plugs.
- While sealing in fittings use sealing tape or sealing compound. If you have to use hemp, apply hemp moderately; do not use excessive amounts of hemp.
- For hot bending of pipes, a hot air gun should be used, not an open flame. The hot air temperature meeting the PP-R pipe surface should not exceed 140°C.
- Do not twist pipe or fittings after joining; correct by not more than 5°.
- For exterior installation, it is necessary to insulate NOVATHERM to prevent excessive heat loss and to protect from UV radiation.
- For a good welding joint, refer to the welding depths and periods that are indicated in NOVATHERM's Technical Catalogue Part 4. Ensure that the indicator light on the welding tool signals that the tool is hot enough (260°C).
- It is recommended to cut the pipe ends by 4-5 cm before the welding process.
- Temperature of the welding adaptors should be high enough for welding process. After the indicator light on the welding machine switches off, adaptors' temperature will be suitable for welding. Welding process should be carried out after this signal. Cold welding affects the stabilization of the raw material and service life of the product.
- Everyday usage of the machine may cause excess temperature of 300-320°C. Excessive heat causes excessive melting of the material. To prevent this, the operator should wait the 2nd signal of the indicator light, since the adaptors' temperature does not change and fixes at 260°C after the 2nd signal.
- NOVATHERM Caps are used ONLY during the pressure tests which should be carried out after the installation of the piping system. Do not use as a permanent stopper at the pipeline ends. Prefer fittings with parallel threads.

9.3 Chemical Resistance

- Consult NOVATHERM Technical Department for transportation of a chemical before installation.
- Remove the installation from chemicals that can affect the service life. NOVATHERM does not warrant any responsibility for the contaminated water that has been affected by permeable chemicals.

Warning: NOVATHERM products are not to be used with compressed air or gases. NOVATHERM does not recommend that piping systems that include its products or components be tested with compressed air or compressed gases.

novatherm®

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