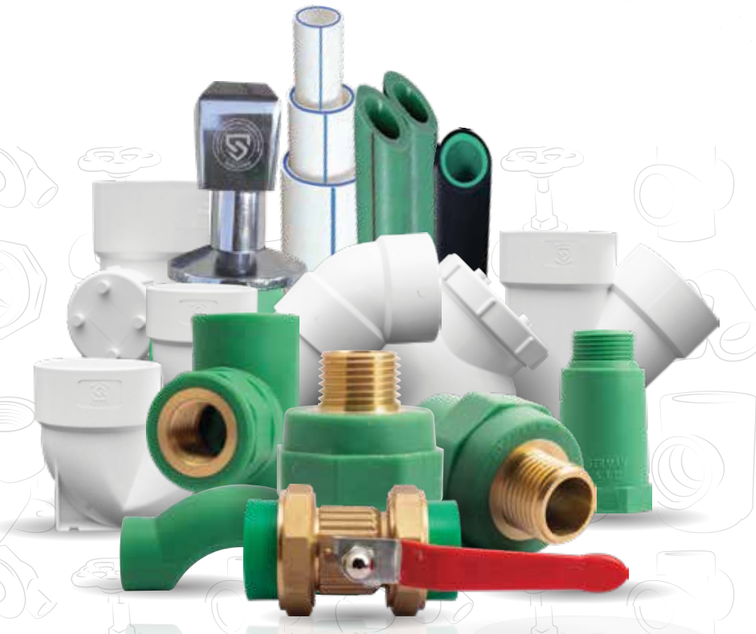
## ARAB COMPANY FOR DEVELOPMENT AND PLASTIC INDUSTRY

# SHIELD PIPE



SHIELD PIPE


الإدارة : ٥٦ صقـر قريش - مساكن شيراتون
الــدور الثــاني شــقة ١٢
ت .: ٢٢٦٨٦٣٠١ - ٢٢٦٨٨٠٥١

مدينة بدر - قلب الصناعية قطعة ٢٨ بجوار إدارة
كهرباء بدر - خلف مجمع التطبيقيين الأنصـارى
ت المصنـع : ٢٨٦٠٧١٧١ - ٢٨٦٠٧١٦٦

01158586655 - 01003132647
01101633880 - 0102 3775678

info@Shieldpipe-eg.com
www.shieldpipe-eg.com

## Content

# Quality Assurance







# CEO Message

**SHEILD PIPES** will Continue To Focus on Further Improving Our Technical Capabilities as a Manufacturer of **PP-R and UPVC** Pipes & Fittings and on Tackling Fresh Challenges towards advanced Technology That Assure a sense of excitement, Trust and Security to our Customers. Surrounded by a team of Plastic experts, Possessing more than 20 years of comboned experience in Plastic, Investing in Top Plastic Technologies and sourcing superior raw materials from the worlds's best manufactirers.

I have determined to deliver nothing less than world class quality to our valuable clients

**Best Regards**

## SHEILD PIPES Vision

Our ambition to position ourselves among the most perfect PP-R Pipes & Fittings manufacturers regionally while comiitting to make **SHEILD PIPES** an obvious synonym and sign to safety, cometitive cost, quality andreliability.

considering that success is not by luck or accidently, we believe that it's arranged journey of progressive and creditbility pursuit of excellence in any field **SHEILD PIPES** takes part into make our ambitious limitless destination vivid.

# Operating & Working Pressure

## Permissible Operating Pressure

**Projected Service Life**
The following table provides more detailed ingormation with regards to the permissible pressure at various temperatures.

These values arederived fom the Hoop Stress Chart and formula. Under normal working pressures and conditions, the average service life ofsuitable PP-R pipes at least 50 Years.

**Example :**
A PN 10, cold water pipe, transporting water at temperature of 30 °C can last for more than 50 years under normal conditions with an operating pressure of 11.1 Bars or 161 P.S.I.

A PN 20, cold water pipe, transporting water at temperature of 70 °C can last for more than 50 years under normal conditions with an operating pressure of 8.5 Bars or 123 P.S.I.

**SDR "Standard Dimention Ratio"** = Diameter/Wall Thickness Ratio [d/e] **s**=Pipes Series
**Index from ISO 4065**) < /p>

### Table 1.1 Permissible Working Pressure (For Potable Water)

| (Bars)/1.25 Safety factor | | Shield Pipe Standard Pipe SDR 11 - 55 | Shield Pipe Standard Pipe SDR 7.4 - S3.2 | Shield Pipe Standard Pipe SDR 6 - S2.5 | Shield Pipe Standard Pipe SDR 5 - S2 |
|---|---|---|---|---|---|
| | | Nominal pressure class | | | |
| Years of service | temperature | PN10 | PN16 | PN20 | PN25 |
| 1 Year | 10 °C | 21.1 | 33.4 | 42.0 | 52.9 |
| | 20 °C | 18.1 | 28.6 | 63.0 | 45.3 |
| | 30 °C | 15.3 | 24.3 | 30.6 | 38.5 |
| | 40 °C | 12.9 | 20.5 | 25.8 | 32.5 |
| | 50 °C | 11.0 | 17.5 | 22.0 | 27.7 |
| | 60 °C | 9.3 | 14.7 | 18.5 | 23.3 |
| | 70 °C | 7.3 | 12.4 | 15.6 | 19.6 |
| | 80 °C | 6.5 | 10.4 | 13.1 | 16.4 |
| | 95 °C | 4.6 | 7.3 | 9.2 | 11.6 |
| 5 Years | 10 °C | 20.0 | 31.6 | 39.8 | 20.1 |
| | 20 °C | 16.9 | 26.8 | 33.8 | 42.2 |
| | 30 °C | 14.4 | 22.8 | 28.7 | 36.1 |
| | 40 °C | 21.1 | 19.2 | 24.2 | 30.5 |
| | 50 °C | 10.2 | 16.2 | 20.4 | 25.7 |
| | 60 °C | 8.6 | 13.7 | 17.2 | 21.7 |
| | 70 °C | 7.2 | 11.4 | 14.3 | 18.0 |
| | 80 °C | 5.7 | 9.1 | 11.5 | 14.4 |
| | 95 °C | 3.0 | 4.8 | 6.1 | 7.6 |



# UPVC Products

**End Cap**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| EC-48 | 1.5" | 100 | 0.050 |
| EC-60 | 2" | 70 | 0.090 |
| EC-75 | 3" | 36 | 0.140 |
| EC-90 | 3" | 36 | 0.175 |
| EC-110 | 4" | 27 | 0.400 |
| EC-114 | 4" | 27 | 0.430 |
| EC-160 | 6" | 12 | 0.750 |
| EC-168 | 6" | 12 | 0.800 |

**Clean Out**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| C4-48 | 1.5" | 100 | 0.075 |
| C4-60 | 2" | 70 | 0.120 |
| C4-75 | 3" | 36 | 0.190 |
| C4-90 | 3" | 36 | 0.230 |
| C4-110 | 4" | 27 | 0.520 |
| C4-114 | 4" | 27 | 0.560 |
| C4-160 | 6" | 12 | 0.975 |
| C4-168 | 6" | 12 | 1.040 |

**Air Vent**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| AV-60 | 2" | 100 | 0.050 |
| AV-75 | 3" | 225 | 0.060 |
| AV-90 | 3" | 170 | 0.120 |
| AV-110 | 4" | 120 | 0.130 |
| AV-114 | 4" | 120 | 0.150 |

# UPVC Products

**Female Threaded Coupling**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| C2-48 | 1.5” | 150 | 0.100 |

**Floor Drain ( 7 cm )**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| FD7-6048 | 2/1.5” | 30 | 0.490 |
| FD7-6060 | 2/2” | 30 | 0.510 |

**Floor Drain ( 10 cm )**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| FD10-6048 | 2/1.5” | 24 | 0.490 |
| FD10-6060 | 2/2” | 24 | 0.580 |
| FD10-7548 | 3/1.5” | 18 | 0.550 |
| FD10-7560 | 3/2” | 18 | 0.620 |
| FD10-9048 | 3/1.5” | 18 | 0.435 |
| FD10-9060 | 3/2” | 18 | 0.435 |

**Rain Drain**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| RD-7590 | 3” | 20 | 0.515 |
| RD-110114 | 4” | 15 | 0.550 |



# Operating & Working Pressure

## Continued

| (Bars)/1.25 Safety factor | | Shield Pipe Standard Pipe SDR 11 - 55 | Shield Pipe Standard Pipe SDR 7.4 - S3.2 | Shield Pipe Standard Pipe SDR 6 - S2.5 | Shield Pipe Standard Pipe SDR 5 - S2 |
|---|---|---|---|---|---|
| | | Nominal pressure class | | | |
| Years of service | temperature | PN10 | PN16 | PN20 | PN25 |
| 10 Years | 10 °C | 19.3 | 30.6 | 38.5 | 48.5 |
| | 20 °C | 16.4 | 26.1 | 32.5 | 41.3 |
| | 30 °C | 13.9 | 22.0 | 27.5 | 34.9 |
| | 40 °C | 11.8 | 18.7 | 23.6 | 29.7 |
| | 50 °C | 9.9 | 15.5 | 19.7 | 24.9 |
| | 60 °C | 8.3 | 13.2 | 16.6 | 20.8 |
| | 70 °C | 7.0 | 11.1 | 14.0 | 17.6 |
| | 80 °C | 4.8 | 7.6 | 9.6 | 12.0 |
| | 95 °C | 2.6 | 4.0 | 5.1 | 6.4 |
| 25 Years | 10 °C | 18.7 | 29.6 | 37.3 | 46.9 |
| | 20 °C | 16.0 | 25.3 | 31.8 | 40.1 |
| | 30 °C | 13.4 | 21.3 | 26.8 | 33.7 |
| | 40 °C | 11.3 | 18.0 | 22.6 | 28.5 |
| | 50 °C | 9.6 | 15.2 | 19.1 | 24.1 |
| | 60 °C | 8.0 | 12.6 | 15.9 | 20.0 |
| | 70 °C | 6.1 | 9.6 | 12.1 | 15.2 |
| | 80 °C | 3.8 | 6.1 | 7.6 | 9.6 |
| 50 Years | 10 °C | 18.2 | 28.8 | 36.3 | 45.7 |
| | 20 °C | 15.5 | 24.5 | 30.9 | 38.3 |
| | 30 °C | 13.1 | 20.7 | 26.1 | 32.9 |
| | 40 °C | 11.0 | 17.5 | 22.0 | 27.7 |
| | 50 °C | 9.3 | 14.7 | 18.5 | 23.3 |
| | 60 °C | 7.7 | 12.1 | 15.3 | 19.2 |
| | 70 °C | 5.1 | 8.1 | 10.2 | 12.8 |
| | 80 °C | N/A | N/A | N/A | N/A |
| 100 Years | 10 °C | 17.7 | 28.1 | 35.4 | 44.5 |
| | 20 °C | 15.0 | 23.8 | 29.3 | 37.5 |
| | 30 °C | 12.8 | 20.2 | 25.5 | 32.1 |
| | 40 °C | 21.3 | 16.9 | 21.3 | 26.9 |
| | 50 °C | 8.9 | 14.2 | 17.8 | 22.5 |
| | 60 °C | N/A | N/A | N/A | N/A |
| | 70 °C | N/A | N/A | N/A | N/A |
| | 80 °C | N/A | N/A | N/A | N/A |

# Operating & Working Pressure

## Table 1.2 Permissible Working Pressure (For Hot Water & Heating Installations) ... Continued

| (Bars)/1.25 Safety factor | | Shield Pipe Standard Pipe SDR 11 - 55 | Shield Pipe Standard Pipe SDR 7.4 - S3.2 | Shield Pipe Standard Pipe SDR 6 - S2.5 | Shield Pipe Standard Pipe SDR 5 - S2 |
|---|---|---|---|---|---|
| | | Nominal pressure class | | | |
| Years of service | temperature | PN10 | PN16 | PN20 | PN25 |
| | | 5 | 11.33 | 14.27 | 17.07 |
| Constant service temperature 70 °C incl.30 days per year at,,, | 57 °C | 10 | 10.95 | 13.79 | 15.20 |
| | | 25 | 9.32 | 11.74 | 15.00 |
| | | 45 | 8.08 | 10.18 | 14.40 |
| | | 5 | 10.72 | 13.50 | 13.88 |
| | 80 °C | 10 | 10.16 | 12.80 | 13.06 |
| | | 25 | 8.84 | 11.14 | 11.72 |
| | | 42.5 | 7.77 | 9.79 | 10.17 |
| | | 5 | 9.85 | 12.42 | 13.32 |
| | | 37.3 | 9.42 | 11.87 | 12.22 |
| | | 25 | 8.05 | 10.14 | 11.06 |
| | | 37.3 | 7.29 | 9.18 | 9.88 |
| | | 5 | 9.04 | 11.39 | 11.74 |
| | 90 °C | 10 | 8.69 | 10.94 | 12.12 |
| | | 25 | 7.03 | 8.86 | 9.91 |
| | | 35 | 6.48 | 8.16 | 8.86 |
| | | 5 | 11.20 | 14.11 | 15.90 |
| | 75 °C | 10 | 10.77 | 13.57 | 14.50 |
| | | 25 | 9.19 | 11.58 | 13.70 |
| Constant service temperature 70 °C incl.60 days per year at,,, | | 45 | 7.97 | 10.05 | 12.80 |
| | | 5 | 10.41 | 13.12 | 15.80 |
| | 80 °C | 10 | 9.96 | 12.54 | 15.40 |
| | | 25 | 8.38 | 10.56 | 13.20 |
| | | 40 | 7.47 | 9.41 | 11.60 |
| | | 5 | 9.55 | 12.03 | 15.78 |
| | 85 °C | 10 | 9.14 | 11.52 | 15.30 |
| | | 25 | 7.31 | 9.22 | 13.30 |
| | | 35 | 6.73 | 8.48 | 11.20 |
| | | 5 | 8.76 | 11.04 | 14.90 |
| | 90 °C | 10 | 7.75 | 9.76 | 12.90 |
| | | 25 | 6.20 | 7.81 | 10.48 |
| | | 30 | 5.92 | 7.46 | 8.45 |



# UPVC Products

### Cross Tee 87.5

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| T6-7575 | 3/3” | 16 | 0.730 |
| T6-11075 | 4/3” | 8 | 0.900 |
| T6-110110 | 4/4” | 10 | 1.135 |

### Reducing Tee 45

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| T7-9060 | 3/2” | 18 | 0.500 |
| T7-11060 | 4/2” | 12 | 0.630 |
| T7-11075 | 4/3” | 12 | 0.655 |

### Coupling

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| C1-32 | 1” | 400 | 0.030 |
| C1-48 | 1.5” | 150 | 0.060 |
| C1-60 | 2” | 105 | 0.100 |
| C1-75 | 3” | 48 | 0.175 |
| C1-90 | 3” | 60 | 0.210 |
| C1-110 | 4” | 36 | 0.355 |
| C1-114 | 4” | 36 | 0.370 |
| C1-160 | 6” | 12 | 0.680 |
| C1-168 | 6” | 12 | 0.720 |

### Bush

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| B1-6048 | 2/1.5” | 200 | 0.070 |
| B1-7560 | 3/2” | 100 | 0.115 |
| B1-9060 | 3/2” | 70 | 0.146 |
| B1-11060 | 4/2” | 48 | 0.250 |
| B1-11075 | 4/3” | 52 | 0.250 |
| B1-11460 | 4/2” | 48 | 0.280 |
| B1-11490 | 4/3” | 52 | 0.280 |
| B1-160110 | 6/4” | 12 | 0.600 |
| B1-168114 | 6/4” | 12 | 0.650 |

# UPVC Products

**Tee 87.5 With Door**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| T3-60 | 2” | 38 | 0.240 |
| T3-75 | 3” | 24 | 0.445 |
| T3-90 | 3” | 10 | 0.515 |
| T3-110 | 4” | 10 | 1.115 |
| T3-114 | 4” | 10 | 1.150 |
| T3-160 | 6” | 4 | 1.825 |
| T3-168 | 6” | 4 | 1.950 |

**Reducing Tee 87.5**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| T4-7560 | 3/2” | 24 | 0.320 |
| T4-9060 | 3/2” | 20 | 0.430 |
| T4-11060 | 4/2” | 10 | 0.640 |
| T4-11075 | 4/3” | 8 | 0.730 |
| T4-11460 | 4/2” | 10 | 0.670 |
| T4-11490 | 4/3” | 8 | 0.750 |
| T4-160110 | 6/4” | 4 | 1.460 |
| T4-168114 | 6/4” | 4 | 1.550 |

**Reducing Tee With Door 87.5**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| T5-7560 | 3/2” | 25 | 0.365 |
| T5-9060 | 3/2” | 20 | 0.485 |
| T5-11060 | 4/2” | 16 | 0.710 |
| T5-11075 | 4/3” | 15 | 0.825 |
| T5-11460 | 4/2” | 15 | 0.740 |
| T5-11490 | 4/3” | 15 | 0.850 |
| T5-160110 | 6/4” | 4 | 1.560 |
| T5-168114 | 6/4” | 4 | 1.650 |



# Operating & Working Pressure

## Continued

| (Bars)/1.25 Safety factor | | Shield Pipe Standard Pipe SDR 11 - 55 | Shield Pipe Standard Pipe SDR 7.4 - S3.2 | Shield Pipe Standard Pipe SDR 6 - S2.5 | Shield Pipe Standard Pipe SDR 5 - S2 |
|---|---|---|---|---|---|
| | | Nominal pressure class | | | |
| Years of service | temperature | PN10 | PN16 | PN20 | PN25 |
| | | 5 | 11.12 | 14.02 | 14.73 |
| | 75 °C | 10 | 10.62 | 13.38 | 13.80 |
| | | 25 | 8.99 | 11.33 | 12.40 |
| | | 45 | 7.80 | 9.82 | 11.20 |
| | | 5 | 10.23 | 12.90 | 16.10 |
| Constant service temperature 70 °C incl. days per year at,,, | 80 °C | 10 | 9.80 | 12.35 | 15.50 |
| | | 25 | 7.97 | 10.05 | 12.71 |
| | | 37.5 | 7.21 | 9.09 | 11.52 |
| | | 5 | 9.37 | 11.81 | 15.15 |
| | 85 °C | 10 | 8.51 | 10.72 | 14.20 |
| | | 25 | 6.81 | 8.58 | 12.16 |
| | | 37.3 | 6.37 | 8.03 | 11.40 |
| | | 5 | 8.41 | 10.59 | 11.30 |
| | 90 °C | 10 | 7.11 | 8.96 | 10.45 |
| | | 25 | 5.69 | 7.17 | 9.22 |

# Physical Properties

| Typical value | Test Method | Main Value | Unit |
|---|---|---|---|
| **PHYSICAL PROPERTIES** | | | |
| Dinsity 23 °C | ISO 1183 | 0.895 | g / cm2 |
| Vicat softening Temperature (0.98 n) | ISO 306 | 130 | C° |
| **RHEOLOGY** | | | |
| Melt Mass Flow Rate MFR (230 °C/2.16 KG) | ISO 1133 | 0.3 | g/10 min |
| **MECHANICAL PROPERTIES** | | | |
| Tensile modules (1mm/min) | ISO 527 - 1.2 | 900 | MPA |
| Tensile srtess yield (50mm/min) | ISO 527 - 1.2 | 27 | MPA |
| Tensile srtess yield (50mm/min) | ISO 527 - 1.2 | 13 | % |
| Charpy impact strength At 23 °C | ISO 179/1eu | N.B | KJ/M2 |
| Charpy impact strength At 20 °C | ISO 179/1eu | 30 | KJ/M2 |
| Charpy impact strength Notched at 23 °C | ISO 179/1eu | 38 | KJ/M2 |
| Charpy impact strength Notched at 20 °C | ISO 179/1eu | 2 | KJ/M2 |
| **THERMAL PROPERTIES** | | | |
| Heat deflection (Temperature 0.45 mpa"HTD/b') | ISO 75 - 1.2 | 88 | ° C |
| Mean coefficient 0f linear (Thermal Expanstion 0:11 °C) | Din 53752 | $1.5 \times 10^{-4}$ | $K^{-1}$ |
| Thermal conductivity | Din 52612 | 0.23 | $K^{-1}\,m^{-1}$ |
| **ELECTRICAL PROPERTIES** | | | |
| Surface resistance | Din 53482 | $>10^{13}$ | ohm. cm |



# UPVC Products

**Female Threaded Elbow**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| E4-48 | 1.5" | 180 | 0.100 |

**P-Trap (Syphon)**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| S1-110 | 4" | 14 | 1.100 |

**Tee 87.5**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| T1-32 | 1" | 175 | 0.065 |
| T1-48 | 1.5" | 110 | 0.125 |
| T1-60 | 2" | 35 | 0.195 |
| T1-75 | 3" | 28 | 0.415 |
| T1-90 | 3" | 20 | 0.405 |
| T1-110 | 4" | 10 | 0.935 |
| T1-114 | 4" | 10 | 0.975 |
| T1-160 | 6" | 4 | 1.750 |
| T1-168 | 6" | 4 | 1.850 |

**Tee 45**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| T2-32 | 1" | 130 | 0.095 |
| T2-48 | 1.5" | 90 | 0.165 |
| T2-60 | 2" | 32 | 0.275 |
| T2-75 | 3" | 16 | 0.470 |
| T2-90 | 3" | 10 | 0.682 |
| T2-110 | 4" | 12 | 1.140 |
| T2-114 | 4" | 12 | 1.175 |
| T2-160 | 6" | 3 | 2.290 |
| T2-168 | 6" | 3 | 2.400 |

# UPVC Products

**Elbiw 90**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| E1-32 | 1” | 250 | 0.050 |
| E1-48 | 1.5” | 160 | 0.090 |
| E1-60 | 2” | 80 | 0.155 |
| E1-75 | 3” | 45 | 0.260 |
| E1-90 | 3” | 23 | 0.360 |
| E1-110 | 4” | 21 | 0.590 |
| E1-114 | 4” | 21 | 0.610 |
| E1-160 | 6” | 8 | 1.250 |
| E1-168 | 6” | 8 | 1.315 |

**Elbow 45**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| E2-32 | 1” | 250 | 0.050 |
| E2-48 | 1.5” | 180 | 0.080 |
| E2-60 | 2” | 60 | 0.125 |
| E2-75 | 3” | 45 | 0.230 |
| E2-90 | 3” | 35 | 0.300 |
| E2-110 | 4” | 24 | 0.500 |
| E2-114 | 4” | 24 | 0.520 |
| E2-160 | 6” | 8 | 1.020 |
| E2-168 | 6” | 8 | 1.100 |

**Elbow 90 With Door**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| E3-60 | 2” | 80 | 0.200 |
| E3-75 | 3” | 40 | 0.305 |
| E3-90 | 3” | 22 | 0.400 |
| E3-110 | 4” | 18 | 0.720 |
| E3-114 | 4” | 18 | 0.750 |
| E3-160 | 6” | 5 | 1.350 |
| E3-168 | 6” | 5 | 1.425 |



# Chemical Tables

| Hostile Environment | Concentration | Chemical resistance | | |
|---|---|---|---|---|
| | | 20°C | 60°C | 100°C |
| 1,2 diamInthanol | TP | Rs | Rs | -- |
| 2 - n itrotoluene | TP | Rs | TR | -- |
| I - ICL/$HMO_3$ | %75 / %25 | NR | NR | NR |
| adipinic acid | TP | Rs | Rs | -- |
| nitric gas | all | Rs | Rs | -- |
| nitric acid | %10 | Rs | TR | NR |
| nitric acid | %10 - 50 | TR | NR | NR |
| nitric acid | >%50 | NR | NR | NR |
| battery acid | V | Rs | Rs | -- |
| acrylonitrile | TP | Rs | TR | -- |
| ally alcohol | 96% | Rs | Rs | -- |
| deluted | AS | Rs | Rs | -- |
| aldehy de | AS | Rs | Rs | -- |
| amber acid | TP | Rs | Rs | Rs |
| amyl alcohol | AS | Rs | Rs | -- |
| ammonia acid | TP | Rs | Rs | -- |
| ammonia gas | TP | Rs | Rs | -- |
| ammonia liquid | TP | Rs | -- | -- |
| acetic acid anhydride | TP | Rs | CR | -- |
| aniline | TP | Rs | CR | -- |
| anone | TP | CR | NR | NR |
| anone (cyclohexanone) | V | Rs | Rs | Rs |
| antifreeze | TP | CR | -- | -- |
| acetaldhyde | TP | Rs | Rs | -- |
| acetaphenone | TP | CR | -- | -- |
| amyle acetate | AS | Rs | Rs | butyl |
| ammonium acetate | TP | CR | NR | NR |
| acetate | AS | Rs | Rs | Rs |
| sodium acetate | TP | Rs | Rs | -- |
| acetone | 35% | Rs | Rs | -- |
| natrium benzoate | TP | R | NR | NR |
| benxol | AS | Rs | Rs | Rs |
| sodium bicarbonate | AS | Rs | Rs | -- |
| potassium bisulphate | HD | Rs | Rs | -- |
| potassium dichromate | AS | Rs | Rs | -- |
| butanediol | TP | Rs | Rs | -- |
| butantriol (1,2,4) | TP | Rs | Rs | -- |
| butylene, liquid | TP | CR | -- | -- |
| butylene glycol | TP | Rs | -- | -- |
| butylene glycol | 10% | Rs | CR | butyl |
| alcohol | TP | Rs | CR | CR |

# Chemical Tables

| Hostile Environment | Concentration | Chemical resistance | | |
|---|---|---|---|---|
| | | 20°C | 60°C | 100°C |
| natrium benzoate | %35 | Rs | RS | -- |
| benzol | TP | R | NR | NR |
| sodium bicarbonate | AS | RS | RS | Rs |
| potassium bisulphate | AS | RS | RS | -- |
| potassium bisulphate | HD | RS | -- | -- |
| potassium dichromate | AS | RS | RS | -- |
| butanediol | TP | RS | RS | -- |
| butantriol (1,2,4) | TP | RS | RS | -- |
| butylene, liquid | TP | CR | -- | -- |
| butylene glycole | TP | RS | -- | -- |
| butylene glycole | %10 | RS | CR | butyl |
| alcohol | TP | RS | CR | CR |
| butylene phenol | AS | RS | -- | -- |
| butylene phenol | TP | HC | -- | -- |
| butine (2) diol (1,4) | TP | RS | -- | -- |
| liquid paraffin | TP | RS | CR | -- |
| fixing agent vat | V | RS | RS | -- |
| wines | V | RS | RS | -- |
| vinyl acetate | TP | RS | YC | -- |
| tartaric acid | %10 | RS | RS | -- |
| wine vinegar | V | RS | RS | Rs |
| distilled water | V | RS | RS | RS |
| air | TP | RS | RS | RS |
| wax | V | RS | CR | -- |
| hexane | TP | RS | CR | -- |
| hexane triol (1,2,6) | TP | RS | RS | -- |
| heptane | TP | RS | CR | HC |
| hydrazine hydrate | TP | RS | -- | -- |
| natrium hydrate | %60 | RS | RS | RS |
| potassium hydrogen carbonate | AS | RS | RS | -- |
| barium hydroxide | AS | RS | RS | RS |
| potassium hydroxide | %50 | RS | RS | RS |
| aniline hydrochloride | AS | RS | RS | -- |
| hydrochloride | AS | RS | RS | RS |
| hydrochloride | TP | RS | CR | - |
| calcium hypocloride | HD | RS | -- | -- |
| sodium hypocloride | %20 | NR | NR | NR |
| sodium hypochlorite | %10 | RS | -- | -- |
| sodium hypochlorite | %20 | CR | CR | NR |
| hydroxiacetic acid | %30 | RS | CR | -- |
| glycrin | TP | RS | Rs | RS |
| glucose | %20 | RS | RS | RS |
| town gas | V | RS | -- | -- |
| diamenthanol | TP | RS | -- | -- |
| tar oil | H | RS | NR | NR |
| dextrin | HD | RS | RS | -- |
| dihexyl fatalat | TR | RS | CR | -- |
| diglycolic acid | AP | RS | RS | -- |
| diesel oil | V | RS | CR | -- |
| di-iso-octyl fatalat | TP | RS | CR | -- |
| di-iso-propyl ether | TP | CR | NR | -- |
| dimenthyl amine | %100 | RS | -- | -- |



# UPVC Products

## المواصفات الأمريكية ASTM D1785 SCH80

| Normal Size | Outside Diameter mm | | SCH 40 White Pipes | | | SCH 80 Gray Pipes | | |
|---|---|---|---|---|---|---|---|---|
| | Min | Max | Thickness mm | Pressure Rating Bar | Wheight k.g/m | Thickness mm | Pressure Rating Bar | Wheight k.g/m |
| 1/2” | 21.20 | 21.20 | 2.80 | 41.40 | 0.24 | 3.70 | 58.60 | 0.31 |
| 3/4” | 26.60 | 26.90 | 2.90 | 33.10 | 0.33 | 3.90 | 47.60 | 0.41 |
| 1” | 33.40 | 33.70 | 3.40 | 31.00 | 0.48 | 4.60 | 43.40 | 0.60 |
| 1 1/4” | 42.10 | 42.10 | 3.60 | 25.50 | 0.65 | 4.90 | 35.90 | 0.84 |
| 1 1/2” | 48.10 | 48.40 | 3.70 | 22.80 | 0.77 | 5.10 | 32.40 | 1.03 |
| 2” | 60.20 | 60.50 | 3.90 | 19.30 | 1.04 | 5.50 | 27.60 | 1.41 |
| 3” | 88.70 | 89.10 | 5.50 | 17.90 | 2.14 | 7.60 | 25.50 | 2.88 |
| 4” | 114.10 | 114.50 | 6.00 | 15.20 | 3.05 | 8.60 | 22.10 | 4.22 |
| 6” | 168.00 | 168.50 | 7.10 | 12.40 | 5.37 | 11.00 | 19.30 | 8.05 |
| 8” | 218.80 | 219.40 | 8.20 | 11.00 | 8.11 | 12.70 | 17.20 | 12.23 |

طول الماسورة ٦ أمتار أو حسب طلب العميل و بدون رأس

## Metric UPVC Pipes for plumbing system (DWV) (White colour with Blue line)

| | | |
|---|---|---|
| SHP3L 4825 | 48 | 2.5 |
| SHP3L 4837 | 48 | 3.7 |
| SHP3L 6027 | 60 | 2.7 |
| SHP3L 6039 | 60 | 3.9 |
| SHP3L 7503 | 75 | 3 |
| SHP3L 7504 | 75 | 4 |
| SHP3L 7505 | 75 | 5 |
| SHP3L 1103 | 110 | 3 |
| SHP3L 1104 | 110 | 4 |
| SHP3L 1105 | 110 | 5 |
| SHP3L 1603 | 160 | 3 |
| SHP3L 1604 | 160 | 4 |
| SHP3L 1605 | 160 | 5 |

مواسير ٣ طبقات بيضاء اللون و طبقة وسطى زرقاء

# UPVC Products


## المواصفات الأمريكية ASTM D2241

| المقاس بالبوصة | Normal Size القطر الخارجي (mm) | | SDR 64 PSI 63 BAR 4.3 Thick of wall/mm | | SDR 41 PSI 100 BAR 6.9 Thick of wall/mm | | SDR 32.5 PSI 125 BAR 8.6 Thick of wall/mm | | SDR 26 PSI 160 BAR 11 Thick of wall/mm | | SDR 21 PSI 200 BAR 13.8 Thick of wall/mm | | SDR 17 PSI 250 BAR 17.8 Thick of wall/mm | | SDR 13.5 PSI 315 BAR 21.7 Thick of wall/mm | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max | Min | Max |
| 1/2” | 21.24 | 21.43 | | | | | | | | | | | | | 1.85 | 2.08 |
| 3/4” | 26.57 | 26.77 | | | | | | | | | 1.53 | 2.03 | 1.58 | 2.08 | 1.99 | 2.48 |
| 1” | 33.28 | 33.52 | | | | | | | 1.53 | 2.03 | 1.60 | 2.10 | 1.96 | 2.46 | 2.47 | 2.97 |
| 1 1/4” | 42.04 | 42.29 | | | | | 1.53 | 2.03 | 1.63 | 2.13 | 2.01 | 2.51 | 2.49 | 2.99 | 3.13 | 3.63 |
| 1 1/2” | 48.11 | 48.41 | | | | | 1.53 | 2.03 | 1.86 | 2.36 | 2.29 | 2.79 | 8.85 | 3.35 | 3.59 | 4.08 |
| 2” | 60.18 | 60.47 | | | | | 1.86 | 2.36 | 2.32 | 2.81 | 2.88 | 3.37 | 3.65 | 4.06 | 4.48 | 4.97 |
| 2 1/2” | 72.85 | 73.20 | | | | | 2.24 | 2.74 | 2.80 | 3.30 | 3.48 | 3.98 | 4.30 | 4.80 | 5.42 | 6.07 |
| 3” | 88.70 | 89.10 | | | 2.16 | 2.66 | 2.75 | 3.25 | 3.43 | 3.93 | 4.25 | 4.74 | 5.24 | 5.86 | 6.58 | 7.36 |
| 4” | 114.08 | 114.52 | 1.78 | 2.28 | 2.80 | 3.30 | 3.51 | 4.01 | 4.40 | 4.90 | 5.44 | 6.09 | 6.74 | 7.54 | 8.46 | 9.47 |
| 6” | 168.00 | 168.55 | 2.56 | 3.14 | 4.12 | 4.62 | 5.19 | 5.79 | 6.48 | 7.26 | 8.03 | 8.99 | 9.91 | 11.90 | 12.48 | 13.97 |

طول الماسورة ٦ أمتار أو حسب طلب العميل و بدون رأس

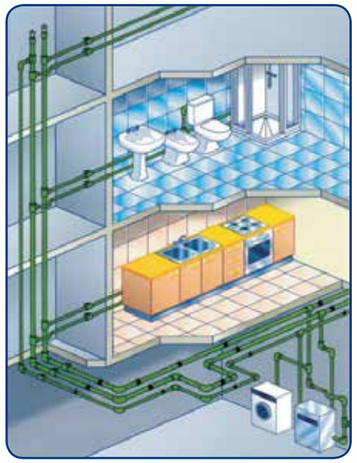


# Chemical Tables

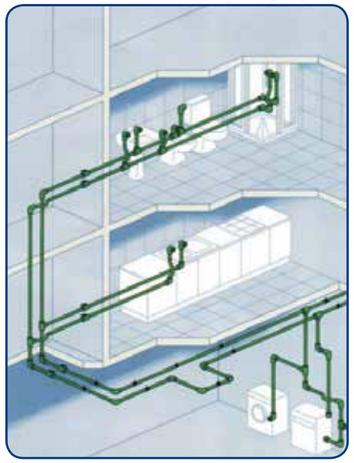
| Hostile Environment | Concentration | Chemical resistance | | |
|---|---|---|---|---|
| | | 20°C | 60°C | 100°C |
| dimethylformamide | TP | Rs | Rs | -- |
| di-n-butyl ether | TP | Cr | -- | -- |
| di-n-onyl fatalat | TP | Rs | CR | -- |
| dioane, | TP | CR | CR | -- |
| sulfur dioxide | all | Rs | Rs | -- |
| sulfur dioxide, gas | TP | Rs | Rs | -- |
| sulfur dioxide, fluid | all | Rs | Rs | -- |
| carbon dioxide, gas | all | Rs | Rs | -- |
| carbon dioxide, fluid | all | Rs | Rs | -- |
| dioctyl fatalat | TP | Rs | CR | -- |
| dichlorobenzene | TP | CR | -- | -- |
| dichloracetic acid | TP | CR | -- | -- |
| dichloracetic acid | 50% | Rs | Rs | -- |
| dichlorethelyne (1, 1-1, 2) | TP | Yc | -- | -- |
| diethyl amine | TP | Rs | -- | -- |
| diethyl ether | TP | Rs | CR | -- |
| leaven | all | Rs | -- | -- |
| gelatin | HD | Rs | Rs | Rs |
| fatty acids >C4 | TP | Rs | CR | -- |
| potassium iodide | AS | Rs | Rs | -- |
| carbolineum | V | Rs | -- | -- |
| ammonium carbonate | GL | Rs | Rs | -- |
| potassium carbonate | GL | Rs | Rs | -- |
| calcium carbonate | GL | Rs | Rs | Rs |
| sodium carbonate | 50% | Rs | Rs | CR |
| carbonimonoxide | all | Rs | Rs | -- |
| carbonsulphide | TP | HC | HC | HC |
| caustic soda | 60% | Rs | Rs | Rs |
| alum | TP | Rs | Rs | -- |
| oxygen | TP | Rs | -- | -- |
| fatty acid | 20% | Rs | -- | -- |
| acid acetanhydride | 40% | Rs | Rs | -- |
| coconut oil | TP | Rs | -- | -- |
| coconut fat spirit | TP | Rs | YC | -- |
| cognac | V | Rs | Rs | -- |
| strach solution | all | Rs | Rs | -- |
| strach syrup | all | Rs | Rs | -- |
| cresol | 90% | Rs | Rs | -- |
| cresol | >90% | Rs | -- | -- |
| silicotfluorine acid | 32% | Rs | Rs | -- |
| fluorosilicic acid | 32% | Rs | Rs | -- |
| silicic acid | all | Rs | Rs | -- |
| xylol, xylene | TP | CR | NR | NR |
| corn oil | TP | Rs | CR | -- |
| citric acid | LD | Rs | Rs | Rs |
| molasses | V | Rs | Rs | Rs |

# System Discription & Standards

**An example of vertical distribution**



**An example of horizontal distribution**

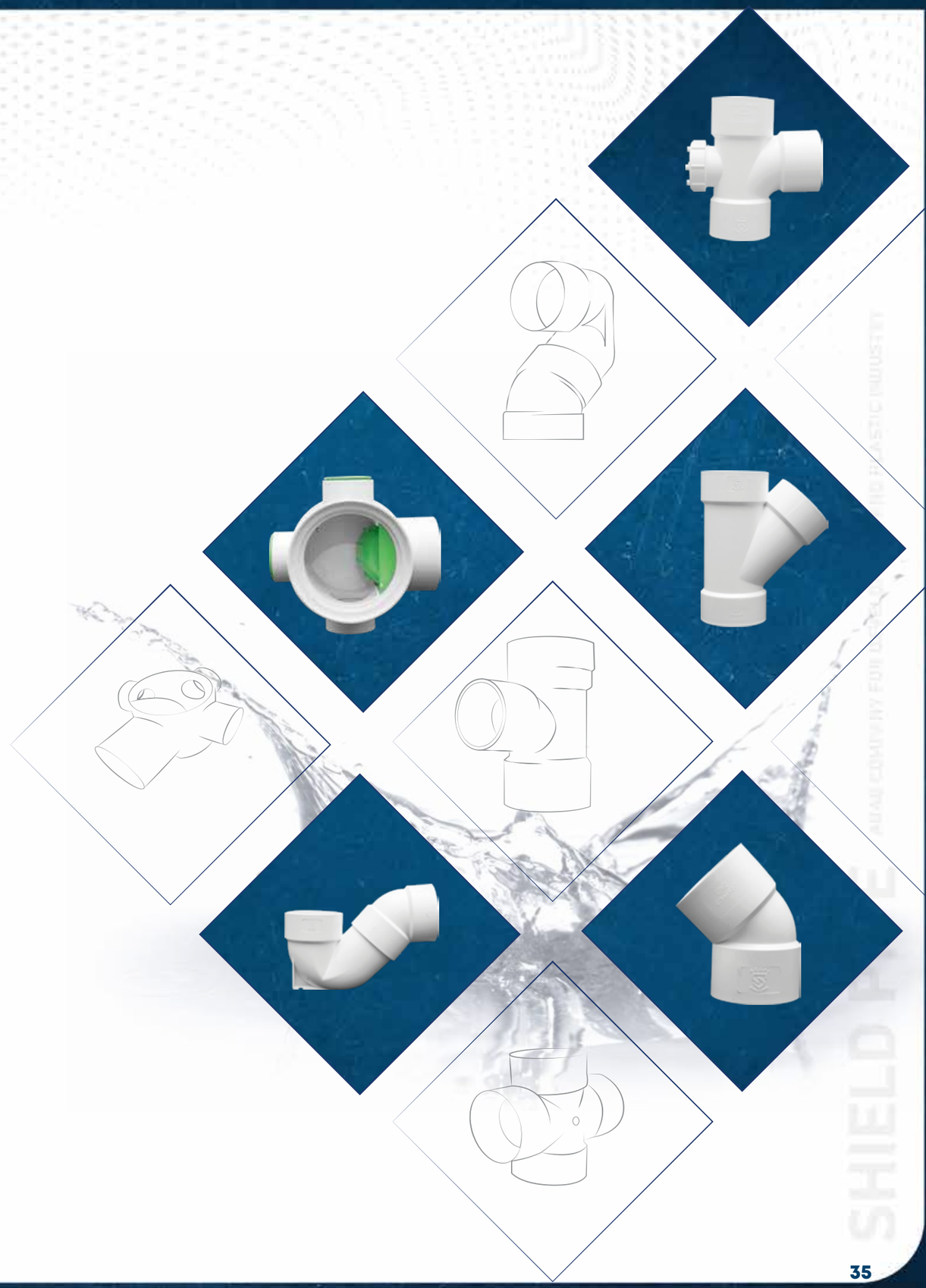


## Placing pipes into the wall

**It is recommended to isolate the pipes in order to achieve better thermal characteristics and protection from condensation.**

**Places in the wall where pipe turns should be filled with some elastic material in order to achieve protection from possible damages.**

Due to the excellent chemical existence of the material, pipes can be placed directly into the wall, without isolation, as there is no danger in direct contact of pipes with cement, lime, plaster, etc.



# PP-R Products

## Boll Valve

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| BV-20 | 20 mm | | 0.255 |
| BV-25 | 25 mm | | 0.335 |
| BV-32 | 32 mm | | 0.615 |
| BV-50 | 50 mm | | 1.330 |
| BV-63 | 63 mm | | 1.785 |

## Concealed Valve

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| CV-203/4 | 20 mm x 3/4” | 12 | 0.476 |
| CV-253/4 | 25 mm x 3/4” | 12 | 0.485 |
| CV-323/4 | 32 mm x 3/4” | 12 | 0.560 |

## Transition PPR Male Union

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| TMU-2012 | 20 mm x 1/2” | 120 | 0.089 |
| TMU-2534 | 25 mm x 3/4” | 90 | 0.160 |
| TMU-321 | 32 mm x 1” | 50 | 0.235 |
| TMU-3234 | 32 mm x 3/4” | 50 | 0.227 |
| TMU-50112 | 50 mm x 1 1/2” | 36 | 0.470 |
| TMU-632 | 63 mm x 2” | 20 | 0.675 |

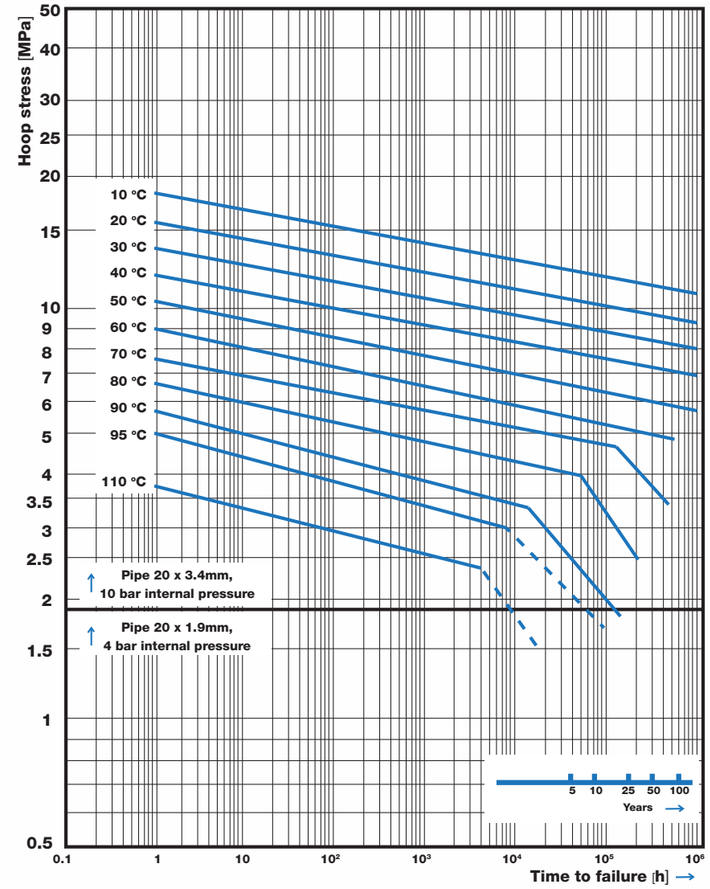
## Transition PPR Female Union

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| TFU-2012 | 20 mm x 1/2” | | |
| TFU-2534 | 25 mm x 3/4” | 105 | 0.132 |
| TFU-321 | 32 mm x 1” | 84 | 0.195 |
| TFU-3234 | 32 mm x 3/4” | 84 | 0.197 |
| TFU-50112 | 50 mm x 1 1/2” | 48 | 0.440 |
| TFU-632 | 63 mm x 2” | 24 | 0.625 |



# Behavior PP-R Pipe

According to DIN 8078 the service life of PP-R pipe depends on the time the internal hoop stress is subjected to a specific temperature, Hoop stress is given as follows:



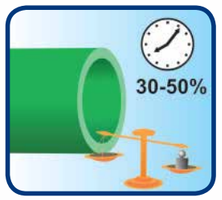

$$\delta = \frac{p \times (d-s)}{20xs}$$

**Where**

**δ = Hoop Stress (N/mm² or MPa)**
**P = Internal Pressure (Bar)**
**d = Outer Diameters of Pipe (mm)**
**S = Wall Thickness of pipe (mm)**

# System Advantages

**Hygienic suitability**
Raw material used for production of **SHEILD PIPES** pipes and fittings is completely non-toxic and meets most rigorous national and international standards in sense of human consumption.




**Easy handling and fast assembly**
Simple way of installing, lightweight of pipes and fittings, simple hand machines and welding tools essentially shorten the time needed to finish making installations.

**Chemicals resistance**
Since PP-R has high molecular weight, installation system **SHEILD PIPES** insures high resistance to acids and alkali such as lime and cement, with which they could come in contact.

**Making corrosion impossible**
PP-R pipes are resistant to any water hardness, so there is no danger of corrosion occurring.

**Resistance to cold weather**
High elasticity of the material allows certain enlargement of pipe volume, if water freezes in pipes.

**Small pressure loss**
**SHEILD PIPES** pipes have very smooth inner wall surface with negligible roughness (0,0070 μ), which results in small pressure loss in pipeline, so there will be no scale forming.



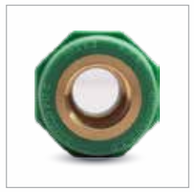
# PP-R Products

**Transition Female Tee**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| TFT-201/2 | 20 mm x 1/2" | 108 | 0.078 |
| TFT-251/2 | 25 mm x 1/2'' | 85 | 0.094 |
| TFT-253/4 | 25 mm x 3/4" | 85 | 0.120 |
| TFT-323/4 | 32 mm x 3/4" | 60 | 0.140 |
| TFT-321 | 32 mm x 1" | 60 | 0.208 |

**Valve Body**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| VB-203/4 | 20 mm x 3/4" | 60 | 0.106 |
| VB-253/4 | 25 mm x 3/4" | 60 | 0.115 |
| VB-323/4 | 32 mm x 3/4" | 50 | 0.190 |



**Transition Piece Round Female**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| TPRF-201/2 | 20 mm x 1/2" | 175 | 0.058 |
| TPRF-251/2 | 25 mm x 1/2'' | 105 | 0.070 |
| TPRF-253/4 | 25 mm x 3/4" | 105 | 0.090 |
| TPRF-323/4 | 32 mm x 3/4" | 84 | 0.120 |
| TPRF-321 | 32 mm x 1" | 84 | 0.135 |
| TPRF-5011/2 | 50 mm x 1 1/2" | 48 | 0.216 |
| TPRF-632 | 63 mm x 2" | 24 | 0.416 |

**Transition Piece Round Male**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| TPRM-201/2 | 20 mm x 1/2" | 140 | 0.076 |
| TPRM-251/2 | 25 mm x 1/2'' | 90 | 0.082 |
| TPRM-253/4 | 25 mm x 3/4" | 90 | 0.109 |
| TPRM-323/4 | 32 mm x 3/4" | 50 | 0.176 |
| TPRM-321 | 32 mm x 1" | 50 | 0.214 |
| TPRM-5011/2 | 50 mm x 1 1/2" | 36 | 0.298 |
| TPRM-632 | 63 mm x 2" | 20 | 0.621 |

# PP-R Products

## Specially developed Brass Inserts

Innovative brass inserts specially designed to provide better brass connections to ensure modified strength to withstand higher tighting torque without breakage or deformation

**Wall Mount ELbow**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| WME-201/2 | 20 mm x 1/2" | 96 | 0.076 |
| WME-251/2 | 25 mm x 1/2" | 96 | 0.080 |

**Transition Elbow Female**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| TEF-253/4 | 25 mm x 3/4" | 90 | 0.116 |
| TEF-323/4 | 32 mm x 3/4" | 70 | 0.130 |
| TEF-321 | 32 mm x 1" | 70 | 0.137 |

**Transition Elbow Male**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| TEM-201/2 | 20 mm x 1/2" | 80 | 0.086 |
| TEM-251/2 | 25 mm X 1/2" | 70 | 0.090 |
| TEM-253/4 | 25 mm x 3/4" | 70 | 0.140 |
| TEM-323/4 | 32 mm x 3/4" | 60 | 0.150 |
| TEM-321 | 32 mm x 1" | 60 | 0.182 |

**Vertical Wall Mount Group**

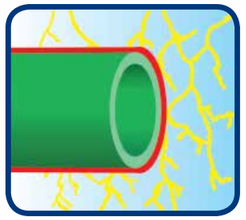
| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| VWMG-201/2 | 20 mm x 1/2" | 35 | 0.173 |
| VWMG-251/2 | 25 mm x 1/2" | 35 | 0.180 |



# System Advantages

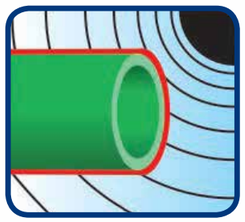
**Excellent acoustic properties**
Flexibility of **SHEILD PIPES** installation system absorbs almost all vibrations and hums which occur due to water flow, which is not the case with metal pipes.


**Duration of the system**
PP-R material is resistant to all thermal and mechanical stresses which occur during exploitation of the system. System will be resistant for over 50 years under continuous pressure of 10 bar and temperature of °67C.



**No problems with itinerant electricity**
**SHEILD PIPES** installation system conducts electricity poorly, so itinerant electricity cannot cause any damage.

**Excellent thermal properties**
Water condensation on outer pipe surface occurs frequently in certain atmospheric conditions (especially on metal pipes). Low thermal conduction of PP-R material (0,23 W/m *K) considerably lowers condensation.



**Resistance to seismic influences**
International commission of experts recommends usage of PP-R ductworks in seismic zones because of the internal pipe elasticity, which absorb possible vibrations.

# Manual Pipe Welding


1. Place the welding machine onto suitable carrier. Heating elements must be fastened using hexagon key.

   Switch the welding machine on, in order to preheat it.

   Cut the pipe to the wanted length using pipe shears (Art. 025) or pipe cutter (Art. 030) vertically in relation to the pipe's axis.

   Pipe's ends must be cut straight. Sharp ends, unevenness, or scrapings on pipes must be removed by appropriate tools (Art. 036 ,035).


2. If you are working with STABI pipes, then the aluminum layer should be removed at each end with STABI peeling tool (Art. 041).

   *One end of STABI pipe must be pushed into the peeling tool and, by turning it, aluminum layer will be peeled to the border-line of the peeling tool, which represents the depth of future welding.*

   *If knives on the peeling tool were correctly placed, after the aluminum layer is peeled off, STABI pipe should be as hard to insert into a welder as regular pipe.*

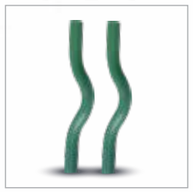

3. Pipes and fittings, together with the welding machine, must be clean and dry. Before welding they should be checked and, if necessary, cleaned with hard paper napkins without fibers or with a clean cloth.


4. Welding machine's socket and spigot length has to be marked on the pipe.

   *Working temperature of a welding machine is °260C which has to be controlled. According to the general guidelines for manual welding, control of working temperature has to be performed with measurement device which has a display with actual temperature reading. Such devices have to insure temperature measurement up to °360C and have to have high measurement precision.*



# PP-R Products



**Over Bridge Bow**

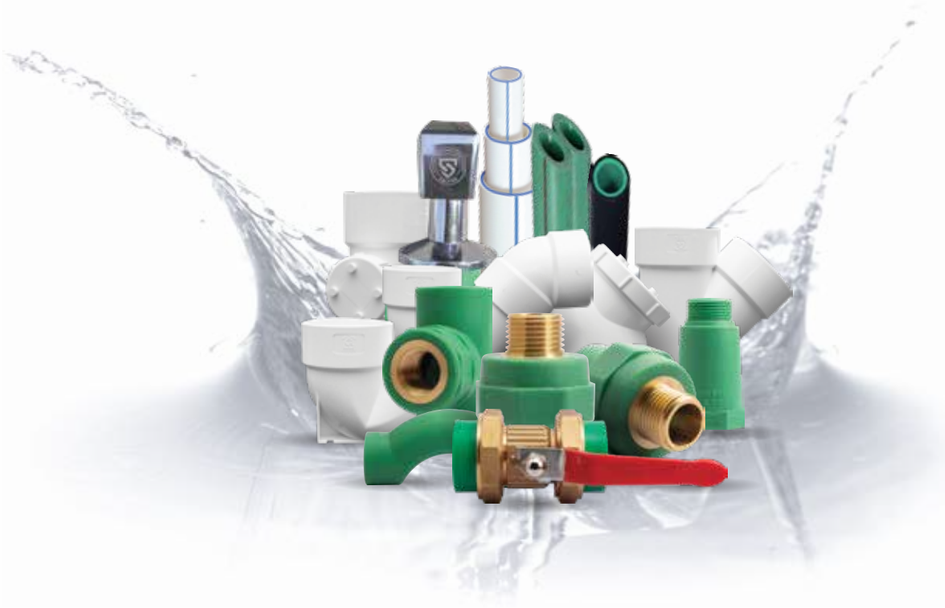
| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| OBB-20 | 20 mm | 30 | 0.060 |
| OBB-25 | 25 mm | 25 | 0.080 |
| OBB-32 | 32 mm | 15 | 0.140 |

**Smart Over Bridge Bow**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| SOBB-20 | 20 mm | 120 | 0.032 |
| SOBB-25 | 25 mm | 60 | 0.066 |

**PPR MANIFOLD**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| PM-5025 | 50/25 mm | 4 | |
| PM-5032 | 50/32 mm | 4 | |
| PM-6325 | 63/25 mm | 4 | |
| PM-6332 | 63/32 mm | 4 | |



# PP-R Products

**Reduceing Tee**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| RT-252025 | 25/20/25 mm | 120 | 0.035 |
| RT-322032 | 32/20/32 mm | 72 | 0.063 |
| RT-322532 | 32/25/32 mm | 72 | 0.065 |
| RT-502050 | 50/20/50 mm | 24 | 0.169 |
| RT-502550 | 50/25/50 mm | 24 | 0.167 |
| RT-503250 | 50/32/50 mm | 24 | 0.161 |
| RT-632063 | 63/20/63 mm | 16 | 0.265 |
| RT-632563 | 63/25/63 mm | 16 | 0.262 |
| RT-633263 | 63/32/63 mm | 14 | 0.258 |
| RT-635063 | 63/50/63 mm | 12 | 0.362 |
| RT-756375 | 75/63/75 mm | 8 | 0.510 |
| RT-906390 | 90/63/90 mm | 8 | 0.820 |
| RT-11075110 | 110/75/110 mm | 4 | 1.380 |

**End Cap**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| EC-20 | 20 mm | 400 | 0.010 |
| EC-25 | 25 mm | 300 | 0.016 |
| EC-32 | 32 mm | 150 | 0.026 |
| EC-50 | 50 mm | 80 | 0.062 |
| EC-63 | 63 mm | 36 | 0.106 |
| EC-75 | 75 mm | 24 | 0.180 |
| EC-90 | 90 mm | 18 | 0.285 |
| EC-110 | 110 mm | 12 | 0.580 |

**End Plug**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| EP-20 | 20 mm | 150 | 0.015 |
| EP-25 | 25 mm | 100 | 0.022 |



# Manual Pipe Welding


**5.** Insert the end of the pipe inside of welding machine socket's female part evenly and without rotating. At the same time attach the fitting on the welding machine spigot's male part, also evenly and without rotating.


**6.** After prescribed heating time, pull the pipe and fitting out of socket and spigot and immediately, without rotating, push the pipe evenly into fitting up to the fitting border line, in order to cover the marked length on the pipe. After few seconds, the pipe and fitting are welded together.

*Pipe must not be pushed into the fitting too deep as this could cause deformation of the pipe and, in extreme cases, deformed pipe could block the passage of water. Welding time for fittings corresponds to heating time.*
*During this time position of the fitting can be corrected. Correction is limited to positioning of pipes and fittings into alignment. Bending of elements is not permitted. After the end of welding time, junction must not be corrected again.*


**7.** **The result of the pipe and fitting's merging (fusion) is a union of installation system fittings.**

**This is an unexampled jointing technique with lifetime guarantee! Sheild Pipe**

# Manual Pipe Welding

Example of calculation for curve's arm's length:

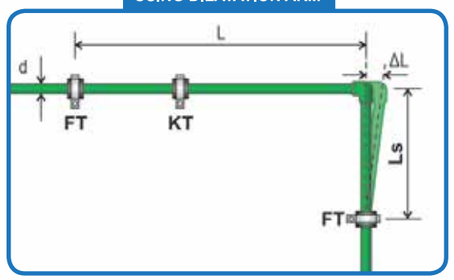
| size | designation | value | measure. unit |
|---|---|---|---|
| curve arm's length (*mm*) | $Ls$ | ? | mm |
| constant of PP-R material | $k$ | 30 | - |
| pipe's outer diameter | $d$ | 25 | mm |
| length difference from the previous calc. | $\Delta L$ | 90 | mm |

$$Ls = k \times \sqrt{d \times \Delta L}$$
$$Ls = 30 \times \sqrt{25 \times 90}$$
$$\boldsymbol{Ls = 1430\ mm}$$

Pictures below show the way for compensation for the length variation ($\Delta L$).
Fixed points must be correctly defined in accordance to curve's length $Ls$.

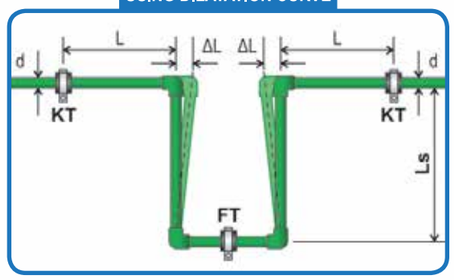
## HOW TO COMPENSATE FOR THE LENGTH VARIATION

### USING DILATATION ARM




**FP** = FIXED POINT, **KP** = FREE POINT, $L$ = PIPE'S LENGHT,
$\Delta L$ = LENGHT VARIATION, $Ls$ = ARM LENGHT,
$d$ = PIPE'S OUTER DIAMETER

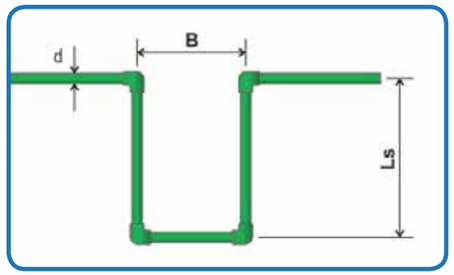
### USING DILATATION CURVE




**FP** = FIXED POINT, **KP** = FREE POINT, $L$ = PIPE'S LENGHT,
$\Delta L$ = LENGHT VARIATION, $Ls$ = ARM LENGHT,
$d$ = PIPE'S OUTER DIAMETER

Dilatation curves must be simple. In order to make a dilatation curve we have to calculate the length of the dilatation arm ($Ls$) that will serve to solve the problem of dilatation.

### DILATATION CURVE FOR PP-RANDOM

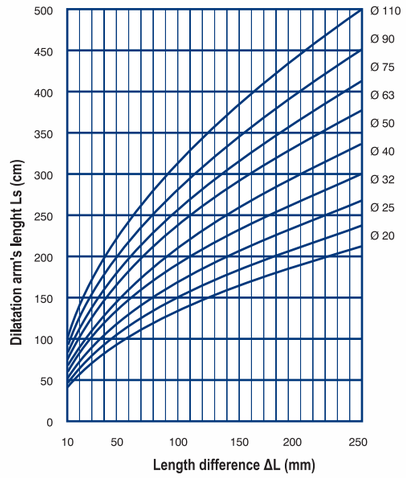



**B** = ARM WIDTH, $Ls$ = ARM LENGTH,
$d$ = PIPE'S OUTER DIAMETER

Width "B" has to be at least 10 times larger than used pipe's diameter.

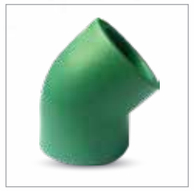
Approximate values of $Ls$ can be seen on the diagram below.

### ARM'S LENGTH (Ls) FOR APPROPRIATE LENGTH VARIATIONS(ΔI)



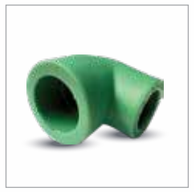



# PP-R Products



**Elbow 45**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| E2-20 | 20 mm | 200 | 0.014 |
| E2-25 | 25 mm | 125 | 0.019 |
| E2-32 | 32 mm | 80 | 0.032 |
| E2-50 | 50 mm | 25 | 0.120 |
| E2-63 | 63 mm | 16 | 0.210 |
| E2-75 | 75 mm | 12 | 0.320 |
| E2-90 | 90 mm | 8 | 0.520 |
| E2-110 | 110 mm | 4 | 0.990 |



**Elbow Reducer**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| ER1-2520 | 25/20 mm | 125 | 0.033 |
| ER1-3225 | 32/25 mm | 60 | 0.057 |

**Reducer Socket**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| RS-2520 | 25/20 mm | 300 | 0.012 |
| RS-3220 | 32/20 mm | 200 | 0017 |
| RS-3225 | 32/25 mm | 200 | 0.018 |
| RS-5020 | 50/20 mm | 60 | 0.055 |
| RS-5025 | 50/25 mm | 60 | 0.075 |
| RS-5032 | 50/32 mm | 60 | 0.079 |
| RS-6320 | 63/20 mm | 45 | 0.104 |
| RS-6325 | 63/25 mm | 45 | 0.102 |
| RS-6332 | 63/32 mm | 45 | 0.098 |
| RS-6350 | 63/50 mm | 27 | 0.120 |
| RS-7563 | 75/63 mm | 16 | 0.158 |
| RS-9063 | 90/63 mm | 9 | 0.220 |
| RS-11063 | 110/63 mm | 6 | 0.350 |
| RS-11090 | 110/90 mm | 6 | 0.470 |

# PP-R Products Fittings & Accessories

**Design and versatility**

Shield pipe s piping systems undergoes careful planning designed with versatility to ensure high reliability performance along with safe and fast installation.

**Elbow 90**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| E1-20 | 20 mm | 200 | 0.021 |
| E1-25 | 25 mm | 120 | 0.029 |
| E1-32 | 32 mm | 80 | 0.053 |
| E1-50 | 50 mm | 25 | 0.143 |
| E1-63 | 63 mm | 16 | 0.202 |
| E1-75 | 75 mm | 12 | 0.445 |
| E1-90 | 90 mm | 8 | 0.700 |
| E1-110 | 110 mm | 4 | 1.250 |

**Socket**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| S1-20 | 20 mm | 343 | 0.013 |
| S1-25 | 25 mm | 225 | 0.019 |
| S1-32 | 32 mm | 128 | 0.033 |
| S1-50 | 50 mm | 60 | 0.079 |
| S1-63 | 63 mm | 27 | 0.139 |
| S1-75 | 75 mm | 16 | 0.204 |
| S1-90 | 90 mm | 9 | 0.340 |
| S1-110 | 110 mm | 6 | 0.410 |

**Equal Tee**

| Art-. No. | Dimension | Packing Unit | Kg/Piece |
|---|---|---|---|
| T1-20 | 20 mm | 180 | 0.026 |
| T1-25 | 25 mm | 96 | 0.038 |
| T1-32 | 32 mm | 56 | 0.065 |
| T1-50 | 50 mm | 18 | 0.188 |
| T1-63 | 63 mm | 12 | 0.327 |
| T1-75 | 75 mm | 8 | 0.515 |
| T1-90 | 90 mm | 8 | 0.890 |
| T1-110 | 110 mm | 4 | 1.480 |



# Installation Design

Generals guidelines for manual welding of hot elements are defined in part 11 of DSV2207 technical code. According to it, heating time of pipes and fittings should be 5 seconds longer if surrounding temperature is below °5+C.

Relevant figures regarding heating times are given in the table on the right.

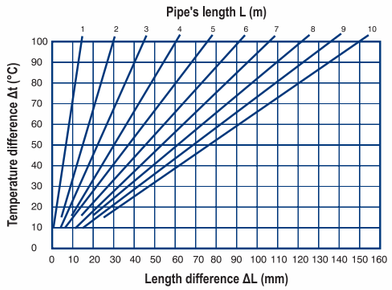
| | | | | | |
|---|---|---|---|---|---|
| **20** | 14,0 | 5 | 8 | 4 | 2 |
| **25** | 15,0 | 7 | 11 | 4 | 2 |
| **32** | 16,5 | 8 | 12 | 6 | 4 |
| **40** | 18,0 | 12 | 18 | 6 | 4 |
| **50** | 20,0 | 18 | 27 | 6 | 4 |
| **63** | 24,0 | 24 | 36 | 8 | 6 |
| **75** | 26,0 | 30 | 45 | 8 | 8 |
| **90** | 29,0 | 40 | 60 | 8 | 8 |
| **110** | 32,5 | 50 | 75 | 10 | 8 |

## Installation design

**Change in PP-R pipes length due to temperature conditions.**

Exposure of PP-R pipes to temperature differences (difference between surroundings temperature and the temperature of the medium that flows through the pipe) results in relatively big change in pipe's length. Elongation and shortening of pipes is called dilatation. Compared to metal pipes, dilatation of PP-R pipes is about 11 times greater, so this change has to be taken into consideration while designing or installing the pipeline.

Difference in length of a 10 m pipe are shown in the diagram below:




Difference in length, regardless of pipe's diameter or wall thickness, can be calculated from the following equation:

$\Delta L = \alpha \times L \times \Delta t\ (mm)$ where:

- $\Delta L$= length difference (mm)
- $\alpha$ = length difference coefficient (mm/m°C)
- $L$ = pipe's initial length (m)
- $t_m$ = temperature of a medium (°C)
- $t_0$ = surrounding's initial temperature (°C)
- $\Delta t$ = temperature difference ($t_m$-$t_0$) (°C)

PP-R pipe coefficient $\alpha$ = 0,15 mm/m°C
PP-R STABI pipe coefficient $\alpha$ = 0,035 mm/m°C

Example of calculation:

| | | | |
|---|---|---|---|
| length difference | $\Delta L$ | ? | mm |
| length difference coefficient | $\alpha$ | 0,15 | mm/m°C |
| pipe's length | L | 12 | m |
| temperature of a medium | $t_m$ | 65 | °C |
| surroundings temperature | $t_0$ | 15 | °C |
| temperature difference | $\Delta t$ | 50 | °C |

$\Delta L = \alpha \times L \times \Delta t\ (mm)$

$\Delta L = 0{,}15\ mm/m^{\circ}C \times 12\ m \times 50^{\circ}C$

$\Delta L = 90$ mm

**Compensation of pipes elongation and shortening**

In most cases it is possible to compensate the variation in length by changing pipe's direction. While doing that we must ensure that pipe is free to dilatate along its main axis. If the variation in length cannot be compensated by changing pipe's direction, then it is necessary to calculate and build a compensation curve.

Curve's length can be calculated by using the following equation: $Ls = k \times \sqrt{d \times \Delta L\ (mm)}$ where:

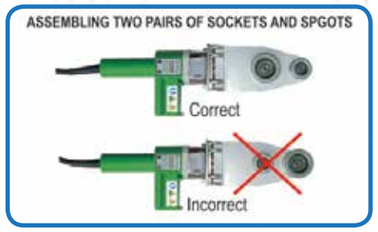
- $Ls$ = curve arm's length (mm)
- $\Delta L$ = length difference (mm)
- $d$ = pipe's outer diameter (mm)
- $k$ = constant - depends on used material (for PP = 30)

# Instructions & Warnings

### 1. Fusion welder

Check carefully if fusion welder you use is in good working condition; it must be preheated to the working temperature of °260C (°5±C) for any diameter of pipes and/or under any conditions.

Do not weld in windy areas (especially when it's cold) because the wind can cause heat variation on the fusion welder. Sometimes, these temperature variations can have values over °50C in relation to the exact working temperature and the thermostat cannot keep up the working temperature.




### 2. Fixed and free points

While fixing the pipe line, number of support points and their type depends on the material the pipe is made of, dilatation, compensation value, future working conditions (combination of pressure and temperature) and type of assembly. Pipelines are fixed with combination of fixed and free points with a presumed length change of the pipe due to dilatation.

Fixed points divide the pipeline into sections in which length dilatation can occur; dilatation must not be prevented on the parts of the pipeline where there are fittings.

Free points enable pipe dilatation (stretching), without disrupting the pipe's axis. Dosed points are achieved using adequate pipe clips (for example Art.001 Jointed pipe clip). Different pipe sections are held on the wall with help of pipe joints. Distance between those pipe clips (support points) depends on future working conditions and pipe weight (together with the fluid which they distribute).

**DISTANCE BETWEEN SUPPORT POINTS (cm)**
Following table shows recommended distances between support points:

| Dia. | °20C | °30C | °40C | °50C | °60C | °70C | °80C |
|---|---|---|---|---|---|---|---|
| **25** | 85 | 85 | 85 | 80 | 75 | 75 | 70 |
| **32** | 100 | 95 | 95 | 90 | 85 | 75 | 75 |
| **40** | 110 | 110 | 105 | 100 | 95 | 90 | 85 |
| **50** | 125 | 120 | 115 | 110 | 105 | 100 | 90 |
| **63** | 140 | 135 | 130 | 125 | 120 | 115 | 105 |
| **75** | 155 | 150 | 145 | 135 | 130 | 115 | 115 |
| **90** | 165 | 160 | 155 | 150 | 145 | 125 | 125 |
| **110** | 190 | 180 | 170 | 170 | 160 | 140 | 130 |

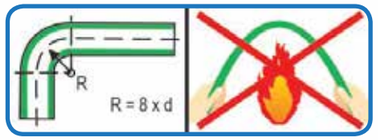
### 3. Cross-overs

In pipe installations, a pipe must often cross over another pipe. Cross overs are suitable for bridging over in such cases.

### 4. Bending

Cold bending may be used when bending radius is minimum 8 times larger than pipe's diameter, and with smaller curves the part of the pipe that is going to be bent should be pre-heated by warm air stream (for example by warm air from hair-drier).

**Use of flame is strictly prohibited.**




### 5. Threaded joints

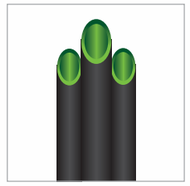
Jointing must be made only by using identical male and female threads (see DIN 2999). It is not recommendable to use conical thread with transition joints of female cylindrical thread.

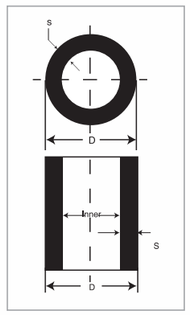
### 6. Sealing

In order to secure efficient sealing of **SHEILD PIPES** installation system, we recommend wraping the thread with an adequate quantity of Teflon or similar tape **Do not apply too much tape.**



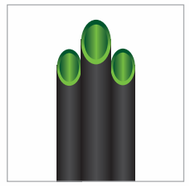
# PP-R Products

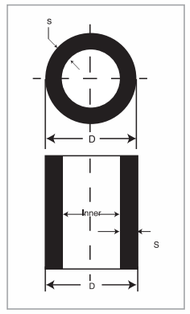





**Shield pipe SDR 7.4 PP-R PN 16 Pipe Series 5**
**According to DIN 8077 / 78 Spacial technology With black layer (UV risistant) for out door and external installations under sunlight**

| Art-. No. | Outer Diameter (OD) mm | Wall Thickness (S) | Internal Diameter (ID) mm | Kg / mt | Water conent l/mt | Packing Unit |
|---|---|---|---|---|---|---|
| B p16-20 | 20 mm | 2.8 | 14.4 | 0.148 | 0.163 | 100 mts |
| B p16-25 | 25 mm | 3.5 | 18 | 0.230 | 0.254 | 100 mts |
| B p16-32 | 32 mm | 4.4 | 23.2 | 0.370 | 0.415 | 60 mts |
| B p16-40 | 40 mm | 5.5 | 29 | 0.575 | 0.651 | 40 mts |
| B p16-50 | 50mm | 6.9 | 36.2 | 0.896 | 1.029 | 32 mts |
| B p16-63 | 63 mm | 8.6 | 45.8 | 1.410 | 1.633 | 20 mts |
| B p16-75 | 75 mm | 10.3 | 54.4 | 2.010 | 2.307 | 16 mts |
| B p16-90 | 90 mm | 12.3 | 65.4 | 2.870 | 3.318 | 12 mts |
| B p16-110 | 110 mm | 15.1 | 79.8 | 4.300 | 5.674 | 8 mts |

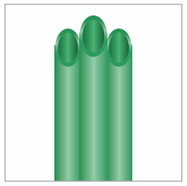


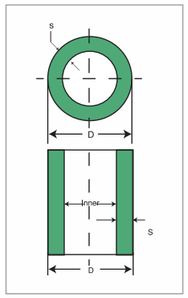



**Shield pipe SDR 6 PP-R PN 20 Pipe Series 6**
**According to DIN 8077 / 78 Spacial technology With black layer (UV risistant) for out door and external installations under sunlight**

| Art-. No. | Outer Diameter (OD) mm | Wall Thickness (S) | Internal Diameter (ID) mm | Kg / mt | Water conent l/mt | Packing Unit |
|---|---|---|---|---|---|---|
| B p20-20 | 20 mm | 3.4 | 13.2 | 0.172 | 0.137 | 100 mts |
| B p20-25 | 25 mm | 4.2 | 16.6 | 0.266 | 0.216 | 100 mts |
| B p20-32 | 32 mm | 5.4 | 21.2 | 0.434 | 0.353 | 60 mts |
| B p20-40 | 40 mm | 6.7 | 26.6 | 0.671 | 0.556 | 40 mts |
| B p20-50 | 50mm | 8.3 | 33.4 | 1.040 | 0.866 | 32 mts |
| B p20-63 | 63 mm | 10.5 | 42 | 1.650 | 1.385 | 20 mts |
| B p20-75 | 75 mm | 12.5 | 50 | 2.340 | 1.693 | 16 mts |
| B p20-90 | 90 mm | 15 | 60 | 3.360 | 2.827 | 12 mts |
| B p20-110 | 110 mm | 18.3 | 73.4 | 5.010 | 4.208 | 8 mts |

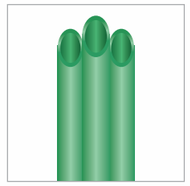
# PP-R Products

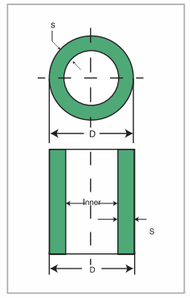





**Shield pipe SDR 6 PP-R PN 20 Pipe Series 6**
**According to DIN 8077 / 78**

| Art-. No. | Outer Diameter (OD) mm | Wall Thickness (S) | Internal Diameter (ID) mm | Kg / mt | Water conent l/mt | Packing Unit |
|---|---|---|---|---|---|---|
| p20-20 | 20 mm | 3.4 | 13.2 | 0.172 | 0.137 | 100 mts |
| p20-25 | 25 mm | 4.2 | 16.6 | 0.266 | 0.216 | 100 mts |
| p20-32 | 32 mm | 5.4 | 21.2 | 0.434 | 0.353 | 60 mts |
| p20-40 | 40 mm | 6.7 | 26.6 | 0.671 | 0.556 | 40 mts |
| p20-50 | 50mm | 8.3 | 33.4 | 1.040 | 0.866 | 32 mts |
| p20-63 | 63 mm | 10.5 | 42 | 1.650 | 1.385 | 20 mts |
| p20-75 | 75 mm | 12.5 | 50 | 2.340 | 1.963 | 16 mts |
| p20-90 | 90 mm | 15 | 60 | 3.360 | 2.827 | 12 mts |
| p20-110 | 110 mm | 18.3 | 73.4 | 5.010 | 4.208 | 8 mts |






**Shield pipe SDR 5 PP-R PN 25 Pipe Series 2**
**According to DIN 8077 / 78**

| Art-. No. | Outer Diameter (OD) mm | Wall Thickness (S) | Internal Diameter (ID) mm | Kg / mt | Water conent l/mt | Packing Unit |
|---|---|---|---|---|---|---|
| p25-20 | 20 mm | 4.1 | 11.8 | 0.198 | 0.111 | 100 mts |
| p25-25 | 25 mm | 5.1 | 14.8 | 0.307 | 0.178 | 100 mts |
| p25-32 | 32 mm | 6.5 | 19 | 0.498 | 0.291 | 60 mts |
| p25-40 | 40 mm | 8.1 | 23.8 | 0.775 | 0.461 | 40 mts |
| p25-50 | 50mm | 10.1 | 29.8 | 1.210 | 0.703 | 32 mts |
| p25-63 | 63 mm | 12.7 | 37.6 | 1.910 | 1.137 | 20 mts |
| p25-75 | 75 mm | 15.1 | 44.8 | 2.700 | 1.619 | 16 mts |
| p25-90 | 90 mm | 18.1 | 53.8 | 3.880 | 2.336 | 12 mts |
| p25-110 | 110 mm | 22.1 | 65.8 | 5.780 | 2.742 | 8 mts |



# Instructions & Warnings

**7. Transport and assembly**

As a consequence of careless handling during working phases, different cuts and damages can occur on **SHEILD PIPES** pipe surfaces. In order to avoid such dangerous situations, handle the pipes with adequate caution and try to secure them from damaging. **Never install damaged pipe or a fitting.**

**8. Low temperatures**

When temperature drops down to °0C or lower, PP-R **SHEILD PIPES** pipes and fittings become brittle, so it is recommendable to handle them with special care in all working phases (special attention is needed when cutting pipes).


**9. UV - rays**

**SHEILD PIPES** pipes and fittings are equipped with UV stabilizer, which makes storing out in the open possible, but despite such stabilizer, it is not recommended to store the pipes in the open for longer than 6 months.

**It is recommended to store PP-R pipes in a way that they are not exposed to UV rays without adequate protection.**

**10. Storage**

**SHEILD PIPES** pipes need to be stored carefully and protected from direct exposure to sunlight. Pipes must not be piled in stacks higher than 1,5 m.

## Recommendations

**1. Jointing of PP-R pipes and galvanized metal pipes**

When jointing PP-R pipe to a galvanized metal pipe, it is recommended to use male threaded transition fitting, in a way that an extra metal fitting, such as coupling, is placed between pipe and fitting.

**Usage of PP-R female threaded transition fitting for jointing PP-R and metal pipes is not recommended.**

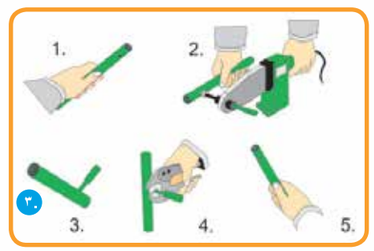

**2. Jointing of PP-R elements with valves**

To accomplish connection between PP-R pipe and fittings with metal valves, PP-R male threaded transition fittings should always be used.

**Avoid jointing PP-R female threaded transition fittings and metal conical threaded nipples.**

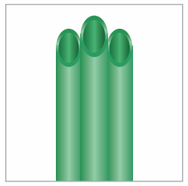

**3. Fixing the holes**

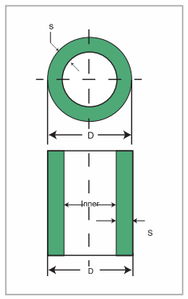
In case that PP-R pipe is pierced, it is possible to fix it using special tools (repair welding sockets) and PP-R pins for pipe repair (Art. 885).



# PP-R Products

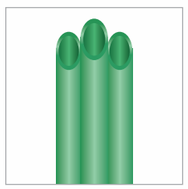
## GROUNDBREAKING PIPE
## Approach Through Innovation

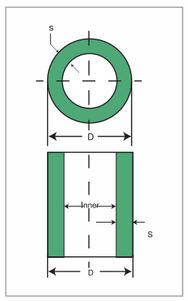





**Shield pipe SDR 11 PP-R PN 10 Pipe Series 4**
**According to DIN 8077 / 78**

| Art-. No. | Outer Diameter (OD) mm | Wall Thickness (S) | Internal Diameter (ID) mm | Kg / mt | Water conent l/mt | Packing Unit |
|---|---|---|---|---|---|---|
| p10-20 | 20 mm | 1.9 | 16.2 | 0.107 | 0.206 | 100 mts |
| p10-25 | 25 mm | 2.3 | 20.4 | 0.164 | 0.327 | 100 mts |
| p10-32 | 32 mm | 2.9 | 26.2 | 0.261 | 0.531 | 60 mts |
| p10-40 | 40 mm | 3.7 | 32.6 | 0.412 | 0.834 | 40 mts |
| p10-50 | 50mm | 4.6 | 40.8 | 0.638 | 1.307 | 32 mts |
| p10-63 | 63 mm | 5.8 | 51.4 | 1.010 | 2.075 | 20 mts |
| p10-75 | 75 mm | 6.8 | 61.4 | 1.410 | 2.941 | 16 mts |
| p10-90 | 90 mm | 8.2 | 73.6 | 2.030 | 4.254 | 12 mts |
| p10-110 | 110 mm | 10 | 90 | 3.010 | 6.362 | 8 mts |






**Shield pipe SDR 7.4 PP-R PN 16 Pipe Series 5**
**According to DIN 8077 / 78**

| Art-. No. | Outer Diameter (OD) mm | Wall Thickness (S) | Internal Diameter (ID) mm | Kg / mt | Water conent l/mt | Packing Unit |
|---|---|---|---|---|---|---|
| p16-20 | 20 mm | 2.8 | 14.4 | 0.148 | 0.163 | 100 mts |
| p16-25 | 25 mm | 3.5 | 18 | 0.230 | 0.254 | 100 mts |
| p16-32 | 32 mm | 4.4 | 23.2 | 0.370 | 0.415 | 60 mts |
| p16-40 | 40 mm | 5.5 | 29 | 0.575 | 0.651 | 40 mts |
| p16-50 | 50mm | 6.9 | 36.2 | 0.896 | 1.029 | 32 mts |
| p16-63 | 63 mm | 8.6 | 45.8 | 1.410 | 1.633 | 20 mts |
| p16-75 | 75 mm | 10.3 | 54.4 | 2.010 | 2.307 | 16 mts |
| p16-90 | 90 mm | 12.3 | 65.4 | 2.870 | 3.318 | 12 mts |
| p16-110 | 110 mm | 15.1 | 79.8 | 4.300 | 5.674 | 8 mts |