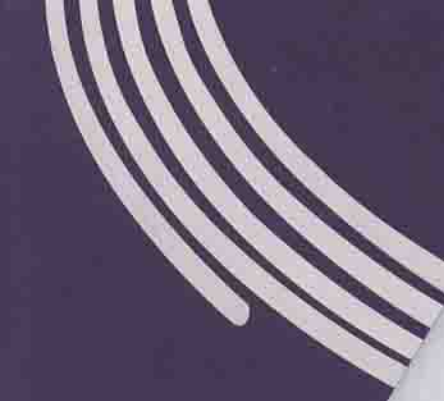




Polypure[®]

Natural
Polypropylene
Piping System

Cost Effective Purity



agru



Polypure®

General

New industry requirements have identified the need for a clean and cost effective thermoplastic piping system.

The Polypure® piping system offers all the benefits to address the new industrial requirements.

The Polypure® natural polypropylene system by AGRU is the most complete, clean and advanced PP piping system for the transportation of pure water and chemicals. With Agru's extensive experience in high purity PVDF piping systems, we can now offer a cost effective solution for many applications.

The Polypure® system is produced from the highest quality virgin resin to provide superior mechanical properties as well as purity. Special production techniques ensure a clean product, while efficient operation reduces costs. Pipes, fittings, valves, flowmeters and semi-finished products offer the only truly complete engineered system.

Material

Polypure® is a random copolymer polypropylene (PPR) offering superior mechanical properties compared to homopolymer polypropylene materials (PPH). Polypure®'s flexural modulus is more than 30% lower than homopolymer polypropylene, making it more flexible. Lower crystallinity makes Polypure® joints more reliable.

Polypure® is a pure polypropylene, offering low leach out characteristics and superior surface quality.

Manufacturing

AGRU uses only one source of virgin natural copolymer PP-resin for pipes, fittings and valves. All Polypure® components are conducted on AGRU's state-of-the-art extrusion and injection molding equipment. The final result is a superior system with an extremely smooth surface finish. Polypure® is designed to provide years of clean and pure operation.

Packaging

Polypure® pipes are capped with unpigmented PE-caps and then sleeved in a PE-film with different quantities.

Polypure® fittings and valves are rinsed in basins with UPW and dried with hepa filtered air. The fittings and valves are single packed in a PE/nylon unpigmented composite bag and the bags are purged with clean, dry nitrogen (class 5.0).



System Construction

- Natural polypropylene provides an alternative choice over other materials for pure applications
- Cost effective piping system
- Polypure® offers the most complete and homogeneous piping system

Natural Polypropylene Piping System

Cost Effective, Reliable and Pure



Quality assurance

The company's success is based on a clearly defined policy, to meet the demands, requirements, wishes and expectations of the clients as well as the subjection of our QM-system to a certification according to ISO 9001.

AGRU has introduced a quality management program, which is following the most stringent requirements according to relevant international standards.

Following to in-house specifications, the testing of different properties (beginning with the incoming raw material to the final product control) is performed at regular intervals.

All produced components are identified with batch numbers designated to each production run. A quality assurance certificate acc. EN 10204 is issued for each batch and the QC-certificate identifies all relevant test data. The certificates are recorded for all produced batches and can be supplied on request.



Ranges of application

- pure water distribution systems
- chemical distribution for DSP- and CMP-systems in the semiconductor industry
- piping systems in process equipment
- mining, paper, chemical effluent treatment plants
- photographic chemical processing facilities
- process piping systems in biotechnology
- food processing
- drain systems in semiconductor manufacturing equipment

Your Advantages with PP natural

- Random copolymer polypropylene (PPR) offers superior mechanical properties
- Random copolymer polypropylene (PPR) provides low leach out characteristics
- Superior surface quality
- Translucent material with no colour pigments

Installation Advantages

- Simple joining techniques:
Butt fusion and non-contact butt fusion (IR) is the proven and accepted technology for the transport of pure water and chemicals
- Lower installation costs than stainless steel
- Polypure® Universal vortex flow meters offer accurate flow without any fluid contamination

Technical Data Polypure®

Polypure® Physical properties

Property	Test Standard	Unit	Polypure®
Density	DIN 53479 ASTM D 792 ISO/R 1183	g/cm ³ lb/ft ³	0,9-0,91 56,6
MFI	DIN 53735 190/5	g/10min	0,5
	230/2,16		0,3
	230/5		1,25
Tensile stress at yield	DIN 53455	N/mm ²	25
		psi	3625
Elongation at yield	ISO/R 527	%	12
Ultimate strength	DIN 53495 ISO/R 527 ASTM D 638	N/mm ²	40
		psi	5800
Elongation at break	DIN 53455 ASTM D 638	%	50
E-modulus (tensile test)	DIN 53 457 ISO 178 ASTM D 1708	N/mm ²	750
		psi	108750
E-modulus (bending test)	DIN 53457 ASTM D 790	N/mm ²	700
		psi	101500
Impact strength notched acc. Charpy	DIN 53453 ISO 179/2C	kJ/m ²	20
Cristalline melting point	DIN 53736	°C	150-154
		°F	302-309
Linear expansion coefficient	DIN 53453	1/K	1,5×10 ⁻⁴
Thermal conductivity 20°C ÷ 150°C	DIN 52612 TMA ASTM D 177	W/mK	0,24
		BTU-in hr-ft ² -°F	1,63
Volume resistance	DIN 53482 ASTM D 177 IEC Publ.93	Ohm cm	>10 ¹⁶
Physiologically non-toxic		—	yes
FDA		—	yes
Abrasion resistance	DIN 53754	mg/100 cycles	13,6
UV-resistance		—	not resistant

Polypure® pressure and temperature ratings

Consult the AGRU piping systems catalog (PE/PP) or contact our engineering department for more information relating to engineering and designing calculations for:

- Thermal Design
- Chemical Resistance
- Installation Practices
- Sizing
- Test Procedures
- System commissioning

The stated table is only valid for water (pipes and fittings). The values for the table taking into account a safety coefficient (C=1,25) and a long term welding factor (f_s=0,8).

Temperature *	Polypure SDR 11/PN10		
	10 years [bar]	25 years [bar]	50 years [bar]
10°C/50°F	15,5	14,9	14,5
20°C/68°F	13,2	12,8	12,4
30°C/86°F	11,1	10,7	10,4
40°C/104°F	9,4	9,1	8,8
50°C/122°F	7,9	7,6	7,4
60°C/140°F	6,6	6,4	6,2
70°C/158°F	5,6	4,7	4
80°C/176°F	3,8	3	—
95°C/203°F	2	—	—

* At PP-natural material a yellow discolouration can appear depending on temperature and operation period. This discolouration has no effects to the mechanical properties

Pipe support and installation

An important criteria for all piping systems is the support system and the correct support distance.

OD [mm]	Support distances [cm] at						
	20°C 68°F	30°C 86°F	40°C 104°F	50°C 122°F	60°C 140°F	70°C 158°F	80°C 176°F
16	49	47	45	43	41	39	38
20	53	50	49	47	45	43	41
25	60	58	56	54	53	50	49
32	71	69	68	65	64	60	56
40	83	80	79	75	71	69	65
50	94	92	90	86	83	79	75
63	109	107	105	101	98	94	90
75	116	113	109	105	101	98	94
90	124	120	116	113	109	105	101
110	139	135	131	128	120	113	105

Pipe support style and fixpoints

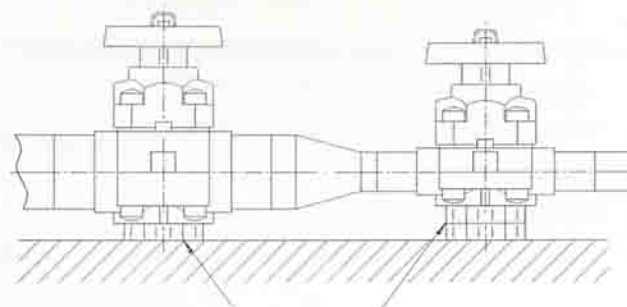
Pipes with OD 20 - 110 mm (1/2" - 4") should be supported by means of pipe clips, which do not restrain the pipe in an axial direction (thermoplastic-clips are preferred).



Support by pipe clips (recommended style)

In all cases support systems should not provide pin point stresses on the piping. In addition, materials that may scratch or wear the piping material must be avoided.

Also diaphragm valves can be utilized as fixed points in a piping system. The mounting plates are used to compensate height differences.



Diaphragm valves used for fixed points

Natural Polypropylene Piping System

Cost Effective, Reliable and Pure

Anchors (Fixed points)



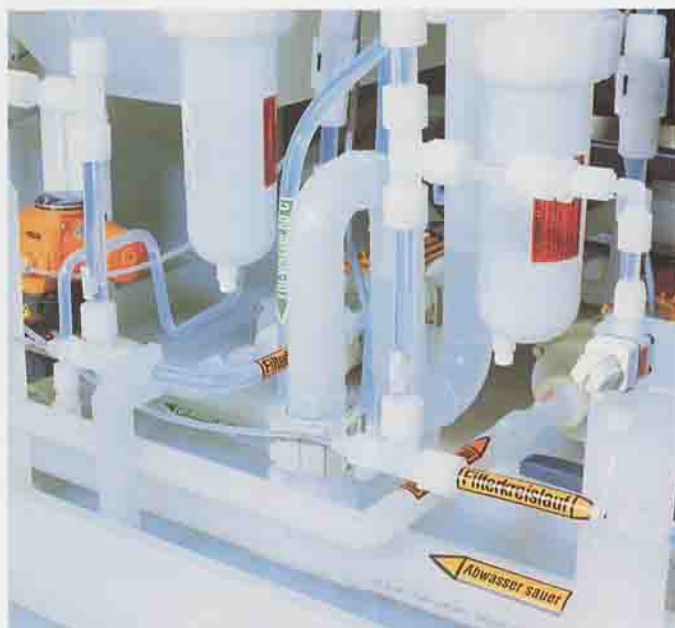
Fixed point configuration (recommended style)

For fixed points in the piping system, restrained fittings should be utilized together with a suitable pipe clip.

The restrained fittings will prevent movement in the axial direction, but will provide the required flexibility in radial direction (stress free also during operation).

Fusion Technology

The Polypure® system is assembled utilizing non-contact butt fusion (IR) or conventional butt fusion processes. Both fusion methods provide superior mechanical properties exceeding the mechanical strength of socket fusion. The preferred welding method is non-contact butt fusion (IR). It provides reduced bead sizes for cleaner system operation.



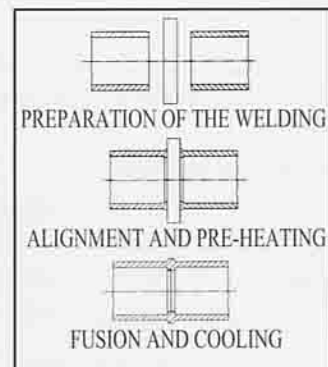
Butt fusion

Butt fusion offers clean reliable fusion with minimal bead sizes compared to socket fusion.

Butt fusion can be used on all sizes and does not require socket fittings when welding pipe to pipe.

The fusion process has to be performed using a butt fusion equipment. Hand held fusion equipment makes it possible to weld in tight corners.

Schematic sketch of the butt fusion process



Non-contact fusion (IR)

Non-contact (IR) butt fusion equipment is also available for welding Polypure® piping system. IR technology offers one more step in purity by eliminating contact with the heating element during the welding process. The shape of the bead is also straighter internally creating less of an area for bacteria growth. With the fully automated fusion equipment AGRU SP-110 and SP-250 you achieve 100% reliability, traceability and control of the joint.



SP-110



Microtomecut of a SP-110 IR- joint

Recommended fusion equipment SP-110

- ☐ IR- and butt fusion
- ☐ Dimension range: 20 - 110 mm ($\frac{1}{2}$ " - 4")
- ☐ weldable materials: PVDF, PP, ECTFE, (PFA)

Recommended fusion equipment SP-250

- ☐ IR- and butt fusion
- ☐ Dimension range: 75 - 250 mm ($2\frac{1}{2}$ " - 10")
- ☐ weldable materials: PVDF, PP, ECTFE

Purity Test Data Specifications Polypure®

Static Leach Out Tests

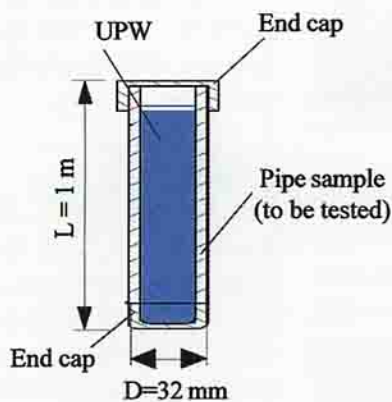
Static leach out tests provide valuable information on material's purity. The static test provides a worst case scenario since the test water is **stagnant**. These tests are useful comparing materials, but do not simulate an actual installation.

When comparing this data to other materials, ensure that the test methods and result units are identical. Results will vary based on test methods.

Sematech Test Method

- **Soak time**
7 days at 20°C (68°F)
- **Anion analyses by IC with suppressed conductivity**
(released values are indicated)
- **Cation analyses by IC with suppressed conductivity and postcolumn derivation with PAR** (released values are indicated)

■ Sample description (for both methods)



Analyzed item		Static Leach Period [days]	Polypure® Converted value [ppb]
			Test temperature 20°C
<u>Anions:</u>	fluoride	7	0,04
	chloride	7	1,06
	nitrite	7	0,35
	bromide	7	0,02
	nitrate	7	0,03
	phosphate	7	0,02
	sulphate	7	1,28
<u>Cations:</u>	lithium	7	0,02
	sodium	7	0,34
	potassium	7	0,02
	magnesium	7	1,46
	calcium	7	0,63
<u>Transitions metals:</u>	iron	7	0,04
	copper	7	0,02
	nickel	7	0,01
	zinc	7	0,39
	cobalt	7	0,03

UCT (Japanese Test Method)

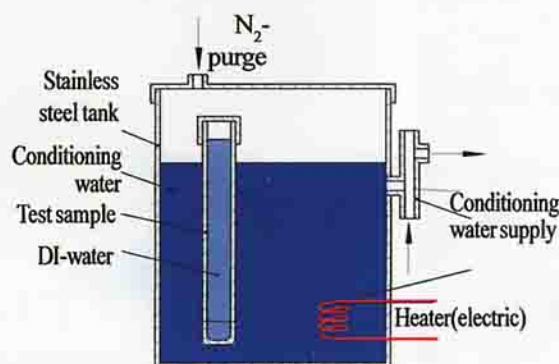
■ Analyse method:

Under the same conditions, 2 pieces each of the same material are analysed. After subtracting outlying observation from the analysed values, the average values are calculated, which were converted into the unit of $\mu\text{g}/\text{m}^2$ day.

The values are leach out results and indicate the quality of leach out per square meter inside of the pipe per day.

■ Test equipment:

The tank is equipped with an electric heater designed for the temperature of 80°C/176°F. The top of the tank is purged with N_2 gas.



■ Test conditions

Temperature: 20°C and 80°C
Sampling periods: 1st day,
2nd-7th day
8th-30th day

Analyzed item	Static Leach Period [days]	Polypure® Converted value [$\mu\text{g}/\text{m}^2$ day]	Polypure® Converted value [$\mu\text{g}/\text{m}^2$ day]
		Test temperature 20°C	Test temperature 80°C
TOC	1	$2,0 \times 10^2$	$3,2 \times 10^4$
	2 - 7	$1,2 \times 10^2$	$1,1 \times 10^4$
	8 - 30	73	$3,6 \times 10^3$
Silicon	1	<19	<19
	2 - 7	<3	<3
	8 - 30	<0,8	<0,8
Sodium	1	1,9	33
	2 - 7	0,96	5,9
	8 - 30	0,15	2
Potassium	1	<0,65	<0,65
	2 - 7	<0,30	<0,11
	8 - 30	<0,03	<0,03
Calcium	1	<1,3	11
	2 - 7	0,41	0,37
	8 - 30	0,07	0,17
Iron	1	<1,3	10
	2 - 7	<0,22	1,7
	8 - 30	<0,06	0,56
Magnesium	1	<0,65	1
	2 - 7	<0,11	0,12
	8 - 30	<0,03	0,06
Tin	1	<9,7	<9,7
	2 - 7	<1,6	<1,6
	8 - 30	<0,42	<0,42
Fluoride	1	<6,5	<6,5
	2 - 7	2,8	<1,1
	8 - 30	4,5	<0,28
Chloride	1	<6,5	25
	2 - 7	<1,1	7
	8 - 30	<0,28	1,8
Sulphate	1	<6,5	<6,5
	2 - 7	<1,1	<1,1
	8 - 30	<0,28	<0,28

Natural Polypropylene Piping System

Cost Effective, Reliable and Pure

Specifications

1.0 SCOPE

All requirements are for natural polypropylene pipes, fittings, valves and associated pipe fusion equipment and procedures. Applicable to installations in UPW systems, chemical plants, refineries, power plants, municipal, institutional or general industrial facilities.

2.0 MATERIALS

Pipe and fittings shall meet the requirements for a random copolymer polypropylene material according to ASTM D-4101-96a and DIN 16774.

Resin shall comply with relevant food stuff regulations, FDA guidelines.

3.0 PIPE

Pipe shall conform to the requirements of DIN 8077/78, ISO 4065 and ASTM D2837-92 for establishing a hydrostatic design basis. In addition, the pipe shall have a standard dimensional ratio of SDR 11 and shall be pressure rated to 10 bar/150 psi at 20°C/68°F for all diameter sizes Dim. 20 - 110 mm (1/2" through 4" nominal diameter). All pipes have to be produced on dedicated extrusion equipment. Pipes shall be provided clean and individually capped and sleeved in a PE-bag in following quantities:

Dim.	Packaging
20	1/2" 5 piece in one PE-bag
25	3/4" 4 piece in one PE-bag
32	1" 3 piece in one PE-bag
40	1 1/4" 1 piece in one PE-bag
50	1 1/2" 1 piece in one PE-bag
⋮	1 piece

All Polypure pipes have to be marked on their outside surface in a controlled distance of 1m. Pipes shall be marked with AGRU Polypure-PP-R-80. The standard length of the pipe shall be 5 meter.

4.0 FITTINGS

Pressure fittings shall conform to the requirements of DIN 16962, ISO 4065 and the same requirements as outlined in „materials 2.0“. In addition, pressure fittings, 20 - 110 mm (1/2" - 4"), shall be injection molded on dedicated equipment, cleaned and supplied individually packaged in PE-bags.

5.0 VALVES

Valves shall be diaphragm type made from the same resin as the pipe and fittings. The valves shall be provided individually tested, bagged and boxed.

Diaphragm valves from 20 - 110 mm (1/2" - 4") shall be spigot uni-body design. Diaphragms shall be either PTFE or EPDM, based on customer preference. All valve handles shall have a position indicator and a locking device. Consult manufacturer for temperature/pressure ratings.

6.0 FLOW METER

All flow meters shall be Universal vortex shedding style and made out of natural PP resin.

Flow meters are to be provided with 4-20 mA or frequency pulse output. All meters must be wet bench calibrated. Calibration certificates are to be provided with each flow meter. Meters shall be wafer style for connection between two flanges.

7.0 PIPE FUSION PROCEDURES

All pipes, fittings and valve joints shall be prepared using butt fusion or non-contact (IR) butt fusion. The welding parameters shall be according to manufacturer recommendations.

7.1 FUSION EQUIPMENT

Fusion equipment shall be SP-110 or SP-250 for butt fusion or non-contact IR butt fusion.

7.2 FLANGE CONNECTION

Flanged connections shall be made by using a stub flange and backing ring arrangement with the use of a suitable gasket material meeting the requirements of DIN 16962/16963 and ASTM F-477

8.0 INSTALLATION, TRAINING AND CERTIFICATION

The installation and fusion of AGRU-Polypure® products shall only be performed by factory trained and certified installers.

Each installer shall complete the AGRU-welding and installation training and certification course. Each installer shall present the certificate from the manufacturer for the SP-fusion equipment.

All Polypure® pipes, fittings and valves shall be properly prepared in accordance with high purity standards and the manufacturers written instructions. Installation methods, including support spacing, support design and expansion compensation shall be in conformance with the manufacturers written recommendations.

All welding parameters should be continuously recorded in compliance with the welding lot number.

QUICK SPECIFICATION FOR POLYPURE® SYSTEM

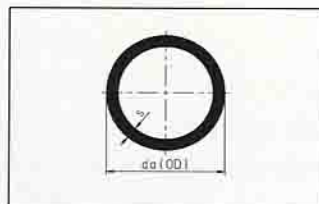
Pipes, fittings, valves and flow meters are to be manufactured of the same random copolymer polypropylene resin and sized according to an SDR pressure rated system to 10 bar (150 psi) at 20°C (68°F).

The system must be joined by butt fusion or IR non-contact fusion methods. Pipes and fittings are to be supplied clean and individually bagged.

Supply Range Polypure®

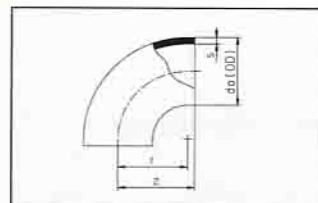
Pipes

for IR- and butt welding
acc. to ÖNORM B 5174
DIN 8077/8078
ASTMD 2837-92



Bends 90°

for IR- and butt welding



Code 705

da / OD		PN 10 / ISO S-5 / SDR 11		
[mm]	[inch]	s	Code	Weight
		[mm]		[kg/m]
20	½"	2,5	705.0020.11	0,136
25	¾"	2,7	705.0025.11	0,186
32	1"	3,0	705.0032.11	0,260
40	1¼"	3,7	705.0040.11	0,412
50	1½"	4,6	705.0050.11	0,638
63	2"	5,8	705.0063.11	1,010
90	3"	8,2	705.0090.11	2,020
110	4"	10,0	705.0110.11	3,010

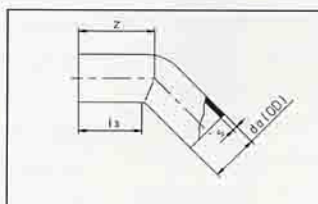
Standard length 5m (16,4 ft), Special lengths on request

Code 001

da / OD		PN 10 / ISO S-5 / SDR 11				
[mm]	[inch]	r	z	Code	s	Weight
		[mm]	[mm]		[mm]	[kg/pc.]
20	½"	23	32 ^{+2,5}	001.0020.11	2,5	0,01
25	¾"	30	38 ^{+2,5}	001.0025.11	2,7	0,01
32	1"	32	43 ^{+2,5}	001.0032.11	3,0	0,02
40	1¼"	40	46 ^{+2,5}	001.0040.11	3,7	0,03
50	1½"	50	58 ^{+2,5}	001.0050.11	4,6	0,10
63	2"	60	70 ^{+2,5}	001.0063.11	5,8	0,15
90	3"	85	100 ^{+2,5}	001.0063.11	8,2	0,33
110	4"	105	124 ^{+2,5}	001.0063.11	10,0	0,62

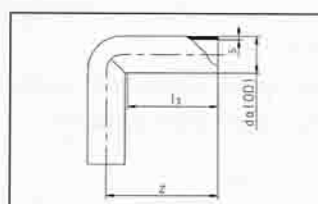
Elbows 45°

for IR- and butt welding



Elbows 90°

for IR- and butt welding



Code 060

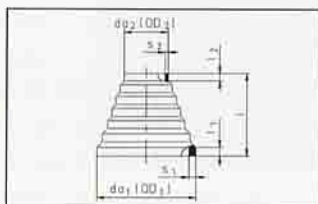
da / OD		PN 10 / ISO S-5 / SDR 11				
[mm]	[inch]	l ₃	z	Code	s	Weight
		[mm]	[mm]		[mm]	[kg/pc.]
20	½"	39 ^{+1,5}	44 ^{+1,5}	060.0020.11	2,5	0,01
25	¾"	42 ^{+1,5}	48 ^{+1,5}	060.0025.11	2,7	0,02
32	1"	49 ^{+1,5}	57 ^{+1,5}	060.0032.11	3,0	0,03
40	1¼"	53 ^{+1,5}	63 ^{+1,5}	060.0040.11	3,7	0,05
50	1½"	57 ^{+1,5}	70 ^{+1,5}	060.0050.11	4,6	0,1
63	2"	64 ^{+1,5}	80 ^{+1,5}	060.0063.11	5,8	0,17
90	3"	82 ^{+1,5}	104 ^{+1,5}	060.0090.11	8,2	0,44
110	4"	82 ^{+1,5}	108 ^{+1,5}	060.0110.11	10,0	0,69

Code 061

da / OD		PN 10 / ISO S-5 / SDR 11				
[mm]	[inch]	l ₃	z	Code	s	Weight
		[mm]	[mm]		[mm]	[kg/pc.]
20	½"	60 ^{+1,5}	70 ^{+1,5}	060.0020.11	3,0	0,02
25	¾"	67 ^{+1,5}	80 ^{+1,5}	060.0025.11	3,0	0,03
32	1"	74 ^{+1,5}	93 ^{+1,5}	060.0032.11	3,0	0,05

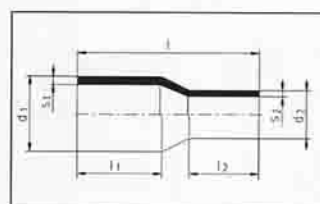
Reducers

concentric
for IR- and butt welding



Reducers

concentric
for IR- and butt welding



Code 007

da ₁ / da ₂ OD ₁ / OD ₂		PN 10 / ISO S-5 / SDR 11					
[mm]	[inch]	l ₁	l ₂	l	Code	s ₁ / s ₂	Weight
		[mm]	[mm]	[mm]		[mm]	[kg/pc.]
63 / 16	2" / 3/8"	54 ⁺²	8	4	007.6316.11	5,8 / 1,8	0,04
110 / 63	4" / 2"	63 ⁺²	9	6	007.1163.11	10,0 / 5,8	0,24

Code 067

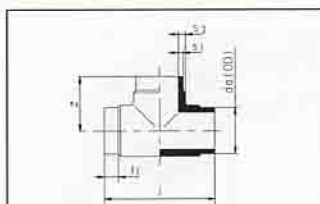
da ₁ / da ₂ OD ₁ / OD ₂		PN 10 / ISO S-5 / SDR 11					
[mm]	[inch]	l ₁	l ₂	l	Code	s ₁ / s ₂	Weight
		[mm]	[mm]	[mm]		[mm]	[kg/pc.]
25 / 20	¾" / ½"	40 ^{+1,5}	41 ^{+1,5}	87 ^{+1,5}	067.2520.11	3,0 / 3,0	0,02
32 / 20	1" / ½"	44 ^{+1,5}	39 ^{+1,5}	95 ^{+1,5}	067.3220.11	3,0 / 3,0	0,03
32 / 25	1" / ¾"	45 ^{+1,5}	40 ^{+1,5}	95 ^{+1,5}	067.3225.11	3,0 / 3,0	0,03
50 / 25	1½" / ¾"	57 ^{+1,5}	46 ^{+1,5}	120 ^{+1,5}	067.5025.11	4,6 / 3,0	0,06
50 / 32	1½" / 1"	59 ^{+1,5}	46 ^{+1,5}	122 ^{+1,5}	067.5032.11	4,6 / 3,0	0,07
63 / 32	2" / 1"	64 ^{+1,5}	49 ^{+1,5}	136 ^{+1,5}	067.6332.11	5,8 / 3,0	0,10
63 / 50	2" / 1½"	66 ^{+1,5}	59 ^{+1,5}	151 ^{+1,5}	067.6350.11	5,8 / 4,6	0,14

Natural Polypropylene Piping System

Cost Effective, Reliable and Pure

Tees

for IR- and butt welding

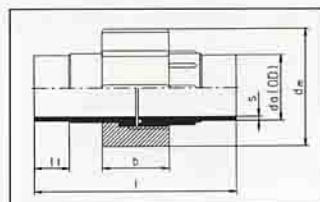


Code 006

da / OD		PN 10 / ISO S-5 / SDR 11						
[mm]	[inch]	l	l ₁	z	Code	s ₁	s ₂	Weight
		[mm]	[mm]	[mm]		[mm]	[mm]	[kg/pc.]
20	1/2"	70 ^{+2,5}	14 ^{+2,5}	35 ^{+2,5}	006.0020.11	2,5	3,3	0,02
25	3/4"	78 ^{+2,5}	14 ^{+2,5}	40 ^{+2,5}	006.0025.11	2,7	4,0	0,02
32	1"	88 ^{+2,5}	16 ^{+2,5}	46 ^{+2,5}	006.0032.11	3,0	4,5	0,04
40	1 1/4"	90 ^{+2,5}	15 ^{+2,5}	50 ^{+2,5}	006.0040.11	3,7	6,8	0,06
50	1 1/2"	100 ^{+2,5}	14 ^{+2,5}	52 ^{+2,5}	006.0050.11	4,6	7,0	0,10
63	2"	125 ^{+2,5}	15 ^{+2,5}	65 ^{+2,5}	006.0063.11	5,8	10,7	0,24
90	3"	207 ^{+2,5}	38 ^{+2,5}	106 ^{+2,5}	006.0090.11	8,2	13,1	0,72
110	4"	240 ^{+2,5}	45 ^{+2,5}	120 ^{+2,5}	006.0110.11	10,0	15,0	1,25

Unions

with VITON O-ring
for IR- and butt welding

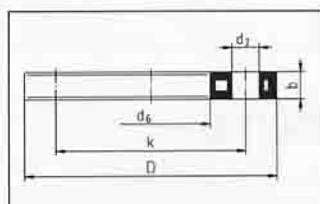


Code 022

da / OD		s	l ^{+2,5}	l ₁ ^{+1,5}	d _m ^{+1,5}	b ^{+1,5}	PN 10 / ISO S-5 / SDR 11	
[mm]	[inch]	[mm]	[mm]	[mm]	[mm]	[mm]	Code	Weight
							VITON O-Ring gasket	[kg/pc.]
20	1/2"	2,5	103	18	51	34,5	022.0120.11	0,08
25	3/4"	2,7	111	18	57	36,0	022.0125.11	0,10
32	1"	3,0	118	22	63	37,0	022.0132.11	0,12
40	1 1/4"	3,7	124	22	74	41,5	022.0140.11	0,16
50	1 1/2"	4,6	132	22	87	46,5	022.0150.11	0,38
63	2"	5,8	137	23	105	49,0	022.0163.11	0,24

Backing Rings

with steel insert
moulded out of PP grey



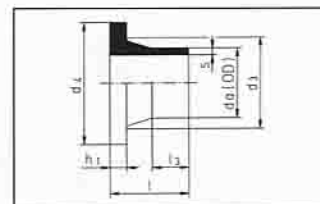
Code 014 acc. to DIN 16962

Code 013 acc. to ANSI

OD		Screws				PN 16			
[mm]	[inch]	DN	D ⁺²	k ⁺¹	d ₁ ⁺¹	Number of screws	Thread	Torque [Nm]	Weight [kg/pc.]
20	1/2"	15	95	65	14	4	M 12	15	0,25
25	3/4"	20	108	75	14	4	M 12	15	0,31
32	1"	25	115	85	14	4	M 12	15	0,42
40	1 1/4"	32	140	100	18	4	M 16	25	0,66
50	1 1/2"	40	150	110	18	4	M 16	35	0,7
63	2"	50	165	125	18	4	M 16	35	0,79
90	3"	80	202	160	18	8	M 16	40	1,24
110	4"	100	222	180	18	8	M 16	40	1,36

Stub Flanges

for IR- and butt welding



Code 012.0 acc. to DIN 16962

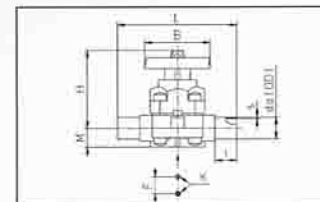
Code 012.1 acc. to ANSI

da / OD		d ₃	d ₄	d ₄ [*]	z	PN 10 / ISO S-5 / SDR 11			
[mm]	[inch]	[mm]	[mm]	[mm]		Code	s	h ₁	h ₄
							[mm]	[mm]	Weight [kg/pc.]
20	1/2"	27	45	44,5	50	012.0020.11	2,5	7	30 ⁺²
25	3/4"	33	58	54,1	50	012.0025.11	2,7	9	25 ⁺²
32	1"	40	68	63,5	50	012.0032.11	3,0	10	18 ⁺²
40	1 1/4"	50	78	71,5	50	012.0040.11	3,7	11	20 ⁺²
50	1 1/2"	61	88	82,5	50	012.0050.11	4,6	12	18 ⁺²
63	2"	75	102	100,4	50	012.0063.11	5,8	14	18 ⁺²
90	3"	105	138	132,4	80	012.0090.11	8,2	17	40 ⁺²
110	4"	125	158	170,5	80	012.0110.11	10,0	18	38 ⁺²

* d₄-measurements according to ANSI standard.

Diaphragm Valves

manually controlled
for IR- and butt welding



Code 342.14 (EPDM/PTFE diaphragm)

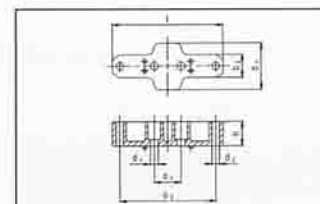
Code 342.15 (PTFE diaphragm)

da / OD		PN 10/SDR11/ISO S-5*									
[mm]	[inch]	DN	l ⁺¹	B ⁺¹	H ⁺³	M ⁺¹	F ⁺¹	K	L ^{+2,5}	Code	s
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[mm]		[mm]
20	1/2"	15	36,0	85	100	16,5	24,5	M6	133	342.1420.11	2,5
25	3/4"	20	36,0	85	100	16,5	24,5	M6	144	342.1425.11	2,7
32	1"	25	36,0	85	107	20,0	24,5	M6	154	342.1432.11	3,0
40	1 1/4"	32	46,0	135	144	31,5	43,5	M8	193	342.1440.11	3,7
50	1 1/2"	40	46,0	135	144	31,5	43,5	M8	194	342.1450.11	4,6
63	2"	50	46,0	135	170	38,5	43,5	M8	224	342.1463.11	5,8

pneumatically actuated on request

Mounting plate for Diaphragm Valves

PP black, GRP reinforced



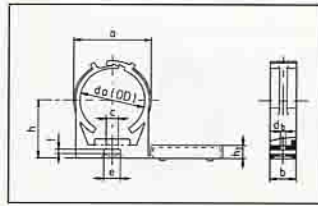
Code 344

Valve dimension DN/OD	h ^{+0,5}	a ₁ ⁺¹	a ₂ ⁺¹	l ⁺¹	b ₁ ⁺¹	b ₂ ⁺¹	d ₁ ^{+0,2}	d ₂ ^{+0,2}	Code
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	
DN 15/20/25 OD 20/25/32	3,5	25	90	104	45	22	7,5	7	344.2035.00
	16	25	90	104	45	22	7,5	7	344.2016.00
	23	25	90	104	45	22	7,5	7	344.2023.00
DN 32/40/50 OD 40/50/63	7,5	45	145,5	164,5	60	30	9,5	9	344.4075.00
	18,5	45	145,5	164,5	60	30	9,5	9	344.4018.00
	23,5	45	145,5	164,5	60	30	9,5	9	344.4023.00

Supply Range Polypure®

Pipe Supports

PP, black

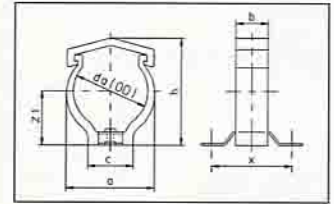


Code 348

da / OD	h	h1	a	b	c	d0	e	f	Code	Weight
[mm] [inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[kg/pc.]
20 3/4"	27	8	29	14	8	4,3	11	3,5	348.0020.00	0,01
25 1"	30	8	34	16	8	4,3	11	3,5	348.0025.00	0,01
32 1 1/4"	30	8	39	16	8	4,3	11	3,5	348.0032.00	0,01
40 1 1/2"	37	8	50	18	8	4,3	11	3,5	348.0040.00	0,02
50 1 3/4"	40	10	56	20	8	4,3	11	3,5	348.0050.00	0,02

Pipe Clips

PP, black



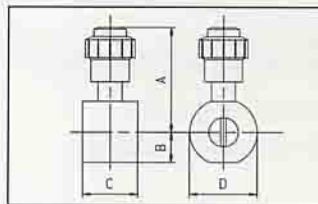
Code 049

da / OD	z1	h	a	b	c	x	Code	Weight
[mm] [inch]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[kg/pc.]
63 2"	52	94	78	30	53	74	049.0063.00	0,08
90 3"	67	128	108	40	57	82	049.0090.00	0,20
110 4"	80	153	132	40	71	82	049.0110.00	0,24

On request also other fittings and dimensions can be supplied :

Vortex Flow Meters

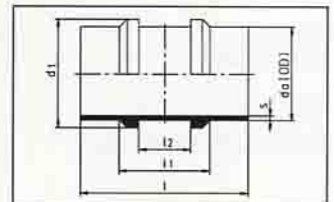
wafer type style



Restrained Fittings

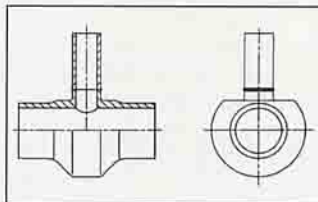
machined
for IR- and butt welding

Code 301



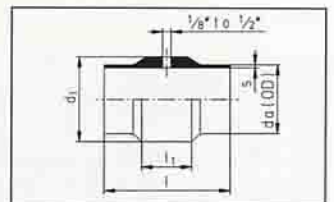
Reduced Tees

machined
for IR- and butt welding



Instrumentation Fitting

with thread connection
1/8" to 1/2" R or
1/8" to 1/2" NPT
machined, for IR- and butt
welding



All components are available from stock:

Pipe stock



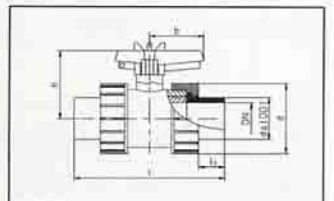
Fitting and valve stock



Ball Valves

manually controlled,
FPM(Viton) sealing
for IR- and butt welding

Code 335.15

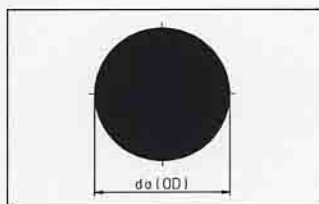


Natural Polypropylene Piping System

Cost Effective, Reliable and Pure

Round Bars

extruded, acc. to DIN 16980
Standard length: 1m (3,28 ft)
Special lengths on request



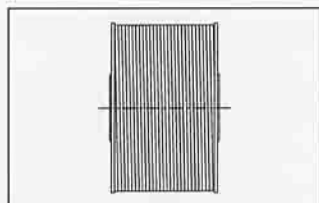
Code 800*

da / OD		Tolerance		Code	Weight [kg/m]
[mm]	[inch]	min. [mm]	max. [mm]		
10	0,39	0,1	0,6	800.0010.10	0,076
15	0,59	0,2	0,7	800.0015.10	0,177
16	0,63	0,2	0,8	800.0016.10	0,195
20	0,79	0,2	1,0	800.0020.10	0,303
25	0,98	0,2	1,1	800.0025.10	0,470
30	1,18	0,2	1,2	800.0030.10	0,674
35	1,38	0,2	1,3	800.0035.10	0,931
40	1,57	0,2	1,5	800.0040.10	1,190
45	1,77	0,3	1,7	800.0045.10	1,510
50	1,97	0,3	2,0	800.0050.10	1,870
55	2,17	0,3	2,1	800.0055.10	2,260
60	2,36	0,3	2,3	800.0060.10	2,690
70	2,76	0,3	2,5	800.0070.10	3,640
75	2,95	0,3	2,5	800.0075.10	4,190
80	3,15	0,4	2,5	800.0080.10	4,740
90	3,54	0,5	2,8	800.0090.10	5,990
100	3,94	0,6	3,0	800.0100.10	7,400
110	4,33	0,7	3,0	800.0110.10	8,940
125	4,92	0,8	3,5	800.0125.10	11,600
135	5,31	0,8	3,5	800.0135.10	13,900
140	5,51	0,9	4,0	800.0140.10	14,500
150	5,91	1,0	4,2	800.0150.10	16,600
160	6,3	1,1	4,5	800.0160.10	18,900
180	7,09	1,2	5,0	800.0180.10	23,900
200	7,87	1,3	5,5	800.0200.10	30,000
220	8,66	1,3	5,5	800.0220.10	36,100
250	9,84	1,3	6,0	800.0250.10	46,500
300	11,81	1,3	7,0	800.0300.10	66,700
315	12,4	1,3	8,0	800.0315.10	70,900

* on request

Welding Rods

extruded



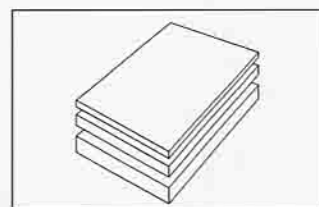
Code 410

da / OD		Length [lfm]	Weight [kg/coil]	Code
[mm]	[inch]			
3	0,118	466 m [-1529 ft]	approx. 3 kg	410.0000.30
4	0,157	262 m [-860 ft]	approx. 3 kg	410.0000.40

Other cross sections (▼♥♣) are available on request

Sheets

compressed



Code 640

Size B x L [mm]	Thickness s [mm]	Code	Weight [kg/sheet]
1000x2000	10	640.2010.10	19,60
	12	640.2010.12	23,50
	15	640.2010.15	29,40
	20	640.2010.20	39,20
	25	640.2010.25	49,00
	30	640.2010.30	58,80
	35	640.2010.35	68,60
	40	640.2010.40	78,40
	45	640.2010.45	88,20
	50	640.2010.50	98,00
	60	640.2010.60	118,00
	70	640.2010.70	137,00
	80	640.2010.80	156,00

Sheets

extruded



Code 600

Size B x L [mm]	Thickness s [mm]	Code	Weight [kg/sheet]
1000x2000	1	600.2010.01	1,88
	2	600.2010.02	3,74
	3	600.2010.03	5,61
	4	600.2010.04	7,50
	5	600.2010.05	9,38
	6	600.2010.06	11,20
	8	600.2010.08	15,00
	10	600.2010.10	18,80
	12	600.2010.12	22,50
	15	600.2010.15	28,10
	20	600.2010.20	37,50
	25	600.2015.25	46,90
3000x1500	2	600.3015.02	8,41
	3	600.3015.03	12,60
	4	600.3015.04	16,90
	5	600.3015.05	21,10
	6	600.3015.06	25,30
	8	600.3015.08	33,80
	10	600.3015.10	42,20
	12	600.3015.12	50,60
	15	600.3015.15	63,30
	20	600.3015.20	84,40

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