CHEMLINE PLASTICS

SUPERIOR FLOW SOLUTIONS

| THERMOPLASTIC INDUSTRIAL PIPING SYSTEMS |

chemline.com

CHEMLINE PLASTICS LTD

Thermoplastic Piping Systems

Piping Systems

- Polypropylene (PP) Pipe & Fittings 1/2" to 56"
- Polypure® Unpigmented PP Piping System 1/2" to 4"
- PVDF Pipe & Fittings to 12"
- ECTFE (Halar®) Pipe & Fittings 1" to 4"
- AirPro® Polyethylene Piping System 1/2" to 4"
- Sani-Tech® PP & PVDF Piping Systems 1/2" to 4"
- Dual Containment Pipe & Fittings
- Custom Fabrication
- Manifold Fabrication

In the field

1. Polypropylene (PP)
2. PolyPure® Unpigmented PP
3. ECTFE (Halar®)
4. PVDF
5. Dual Containment
6. Polypropylene (PP)
7. AirPro® Polyethylene

System	Page
Single Containment	
Polypropylene – PP	*4*
Polypure® Unpigmented Polypropylene – UPP	*5*
PVDF	*6*
ECTFE (Halar®)	*7*
AirPro® Polyethelyne for Compressed Air – Blue PE	*8*
MineLine Poylpropylene + Polyetheylene – PP + PE	*9*
Dual Containment	
PP/PE/PVDF	*10*
Thermoplastic Manifolds	
PVC/CPVC/PP/PE/PVDF/ECTFE	*11*

Pipe Size + Welding Machine Selection Tool

Imperial			Metric	Contact Butt Fusion								Contact Socket Fusion		Infrared Butt Fusion				Beadless Butt Fusion		Electro Fusion	Hot Air Fusion
OD				Manual		Hydraulic								Manual	CNC						
IPS Inches	Inches	mm (converted)	Metric Pipe OD (mm)	Miniplast/2	Maxiplast	4400	4600	4900	5100	5500	6100	HSOC Manual	3500 Bench	IR-Miniplast/2	SP110/SP110S.10S	SP250S	SP315S	SP110B	SIB-2	HPF Beaded - Beadless	HA30-400
1/2"	0.84	21.34	20																		
3/4"	1.05	26.67	25																		
1"	1.32	33.40	32																		
1-1/4"	1.66	42.16	40																		
1-1/2"	1.90	48.26	50																		
2"	2.38	60.33	63																		
2-1/2"	2.88	73.33	75																	PP	
3"	3.50	88.90	90																	PP	
4"	4.50	114.30	110																	PP	
–	4.80	121.92	125																		
5"	5.56	141.30	140																		
6"	6.63	168.28	160			✓															
–	6.90	175.26	–																		
7"	7.13	180.98	180																		
8"	8.63	219.08	200																		
–	9.05	229.87	225																		
10"	10.75	273.05	250				✓														
12"	12.75	323.85	280					✓													
–	–	–	300																		
–	13.20	335.28	315																		
14"	14.00	355.60	355																		
16"	16.00	406.40	400																		
–	17.40	441.96	–																		
18"	18.00	457.20	450																		
–	19.50	495.30	–																		
20"	20.00	508.00	500																		
21-1/2"	21.50	546.10	–																		
22"	22.00	588.80	560																		
24"	24.00	609.60	–																		
–	–	–	630																		

Welders can process any metric pipe in the yellow and blue range. IPS sizes need special main clamps and/or reducer inserts.
To verify IPS pipe sizes, look up the IPS OD converted to mm. If close to the metric equivalent, the welder can weld the IPS pipe.
PP – beaded electro-fusion of PP up to 110mm, beadless electro-fusion of PVDF up to 63mm.

key:

- ✓ Conversion main clamp kit for imperial pipe, upon request
- DA range - metric pipe
- OD range - imperial pipe (with special parts, upon request)
- Both ranges overlap (with special parts for imperial pipe, upon request)

CHEMLINE PLASTICS LTD

Polypropylene Piping System

Polypropylene

characteristics

- Low specific gravity
- High operating temperature
- High creep resistance
- High heat aging stability
- Easily welded
- High chemical resistance
- High abrasion resistance
- Good elasticity
- Low frictional resistance to fluids
- Suitable for food applications

applications

- Aggressive industrial chemicals up to 90°C (194°F)
- Potable liquids
- Slurries
- Food industry
- Cold and hot water supply for sanitary installations
- Floor heating systems
- Suction and/or exhaust piping systems

temperature range

- **PP-H:** –5 to 90°C (23 to 194°F)
- **PP-R:** –20 to 90°C (–4 to 194°F)

Polypropylene is a member of the polyolefin family and is used in a wide variety of applications from acids and alkalies to organic solvents and even pure water. PP is one of the best materials to use for systems exposed to varying pH levels, as many plastics do not handle both acids and bases well. PP is ductile at ambient temperature and demonstrates good impact strength. It also has good thermal stability up to 90°C (194°F) compared to other thermoplastics such as HDPE and PVC. It is not recommended for use with strong oxidizing acids, aromatics and chlorinated hydrocarbons.

Polypropylene is available in two grades:

- **Homopolymer (PP-H)** made from Type I resin conforming to ASTM D 4101, produced from 100% propylene monomer
- **Copolymer (PP-R)** made from Type II resin produced from 94% propylene with 6% ethylene. Copolymer resins generally exhibit better impact strength.

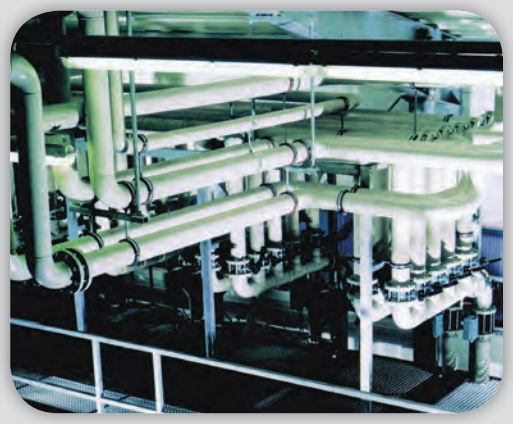
Polypropylene (PP-R and PP-H) comply with various food regulations (FDA, OENORM B 5014 Part 1, BGA, KTW guidelines).

PP

CRN Registered Consult Chemline

PRODUCT RANGE (ODmm)[1]

PIPE:	12 – 1,400
BUTT FUSION FITTINGS:	20 – 630
ELECTRO FUSION FITTINGS:	20 – 710
SOCKET FUSION FITTINGS:	20 – 110
ACCESSORIES (FLANGES):	20 – 630



special types of polypropylene

Special blends of PP such as flame retardant and electro-conductive PP.

Black PP-R: Black pigment is added to the PP which gives it much better UV resistance.

Unpigmented PP-R: Contains no colour additives and can be used for high purity water piping systems. This material is not UV resistant.

PP-H-s: Additives make this PP more fire retardant and increases stiffness making it well suited for ventilation. It is not UV resistant.

PP-R-el: High carbon black content makes, PPR-el conductive as well as UV resistant. Electro-static charges generated by the flow of fluids or dust can develop in thermoplastic piping systems presenting a danger in volotile environements. This conductive material can be grounded.

PP-R-s-el: This PP material has both flame retardant and electrically conductive properties.

Permissible Operating Pressures

Operating Temperature °C	Operating Temperature °F	Operating Period Years	Permissible Operating Pressure SDR 41 PN 2.5 psi	SDR 33 PN 3.2 psi	SDR 26 PN 4 psi	SDR 17.6 PN 6 psi	SDR 11 PN 10 psi	SDR 7.4 PN 16 psi	SDR 6 PN 20 psi
10	50	50	42	52	67	102	170	266	340
20	68	50	36	46	58	87	150	232	290
30	86	50	30	38	49	73	122	190	245
40	104	50	29	36	46	70	116	182	233
50	122	50	23	30	38	58	96	150	193
60	140	50	21	26	34	51	86	134	173
70	158	50	14	18	22	34	56	87	111
80	176	25	10	13	18	26	43	67	87
90	194	10	10	12	14	22	36	57	73
95	203	10	7	10	12	18	30	47	60

[1]Range varies depending on specific fitting. See price list for details.

Unpigmented Polypropylene

characteristics

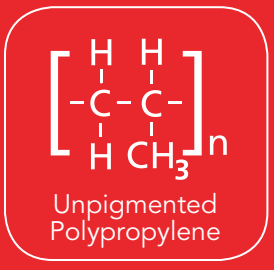
- Low specific weight
- High operating temperature
- High creep strength
- High heat aging stability
- Good weldability
- High chemical resistance
- High abrasion resistance
- Good elasticity
- Low frictional resistance
- Usable on food applications

applications

- USP purified water systems
- Deionized water systems
- RO water systems
- Electronics industry chemical distribution systems
- Photographic chemical processing
- Food industry
- Biotechnology process piping
- Semiconductor manufacturing drain systems
- Universities
- Hospitals

temperature range

- **UPP:** –20 to 90°C (–4 to 194°F)



Unpigmented Polypropylene (UPP) is produced from high-purity virgin random copolymer (PP-R) made up of 94% propylene with 6% ethylene conforming to ASTM D 4101 and DIN 16774 resulting in an extremely pure product. U-PP shows excellent purity levels when tested in standard static leach tests (better than High-purity PVC) and has a superior surface quality (Ra = 0.4 to 1.5 µm), making it ideal for high-purity systems.

UPP complies with the various food regulations (FDA, OENORM B 5014 Part 1, BGA, KTW guidelines) and USP Class VI .

UPP is not UV resistant.

Permissible Operating Pressures

Operating Temperature °C	°F	Operating Period Years	SDR 11 PN 10 psi
10	50	50	170
20	68	50	150
30	86	50	122
40	104	50	116
50	122	50	96
60	140	50	86
70	158	50	56
80	176	25	43
90	194	10	36
95	203	10	30

UPP

PRODUCT RANGE (ODmm)[1]

PIPE:	20 – 110
BUTT FUSION FITTINGS:	20 – 110
SOCKET FUSION FITTINGS:	20 – 63
ACCESSORIES (FLANGES):	20 – 110

[1]Range varies depending on specific fitting. See price list for details.

CHEMLINE PLASTICS LTD

PVDF Piping System

PVDF

characteristics

- High operating temperature
- Good mechanical properties
- High heat aging stability
- Good weldability
- High chemical resistance
- High abrasion resistance
- Low frictional resistance
- Self-extinguishing
- High resistance to permeation
- High resistance to UV and gamma radiation

applications

- Bromine processing
- Corrosive chemicals
- Electronics manufacturing
- Food industry
- Universities
- Hospitals
- Pulp mill bleaching
- Sanitary applications
- Ultrapure water

temperature range

- –40 to 121°C (–40 to 250°F)

PVDF (Polyvinylidene fluoride) is an extremely pure fluorocarbon polymer that does not contain UV stabilizers, thermo stabilizers, softeners, lubricants or flame-retardant additives. It is particularly suitable for ultra-pure water and for the transport of clear chemical liquids in the semi-conductor industry. It is recognized for its high mechanical strength over a large working temperature range, excellent resistance to most corrosive chemicals and many organic solvents, excellent abrasion resistance and excellent against the effects of UV and gamma radiation.

PVDF offers excellent fire protection without flame-retardant additives (V-O rating according to the UL-94 vertical flame test) and during combustion has only a slight amount of smoke development.

PVDF is non toxic and imparts no odours or tastes into the fluid and conforms with FDA regulations as outlined in Title 21, Chapter 1, Part 177-2510 (contact with food) and is compliant with ROHS.

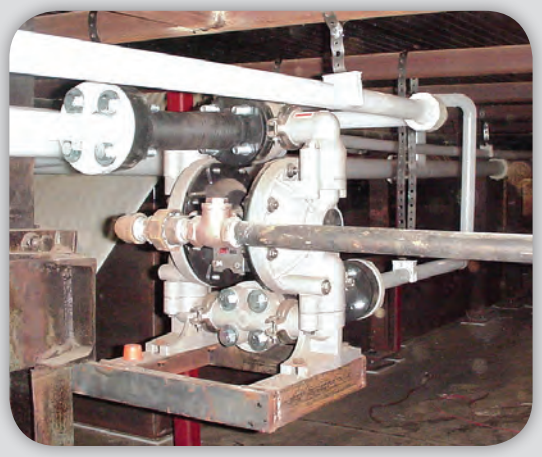
PVDF is also recognized by the Canadian Food Inspection Agency by "Letter of No-Objection" for use in any food applications.

PVDF

CRN Registered Consult Chemline

PRODUCT RANGE (ODmm)[1]

PIPE:	16 –	400
BUTT FUSION FITTINGS:	20 –	315
ELECTRO FUSION FITTINGS:	20 –	63
SOCKET FUSION FITTINGS:	20 –	110
ACCESSORIES (FLANGES):	20 –	315



Permissible Operating Pressures

Operating Temperature °C	Operating Temperature °F	Operating Period Years	Permissible Operating Pressure SDR 33 PN 10 psi	SDR 33 PN 10 bar	SDR 21 PN 16 psi	SDR 21 PN 16 bar
20	68	50	125	8.64	198	13.6
30	86	50	113	7.76	178	12.2
40	104	50	102	7.04	162	11.1
50	122	50	88	6.08	138	9.5
60	140	50	80	5.52	126	8.6
70	158	50	70	4.88	113	7.8
80	176	50	60	4.16	95	6.6
95	203	50	34	2.32	52	3.6
110	230	50	18	1.28	29	2.0
120	248	25	15	1.04	23	1.6

[1]Range varies depending on specific fitting. See price list for details.

CHEMLINE PLASTICS LTD

ECTFE (Halar®) Piping System

ECTFE (Halar®)

characteristics

ECTFE (Halar®) is suitable for many applications, especially where requirements include high chemical resistance:

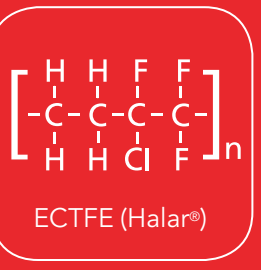
- Excellent resistance to mineral and oxidized acids, alkaline, metal-etching products, liquid oxygen, chlorine and all organic solvents. Exceptions are hot amines, sodium and potassium.
- High impact resistance
- High abrasion resistance
- High resistance to UV and gamma radiation
- High pressure load resistance
- High insulating and electrical resistance properties
- High flame retardancy
- High resistance to microorganism growth
- Low frictional resistance

applications

- Chemical feed systems
- High-purity water systems
- Process piping

temperature range

- –76 to 150°C (–105 to 302°F)
- short term exposure to 170°C (338°F)



ECTFE (Halar®) is a durable copolymer of ethylene and chlorotrifluoroethylene and is resistant to a wide variety of corrosive chemicals and organic solvents including strong acids, chlorine, and aqueous caustics and is best known by its trade name Halar. It has excellent abrasion resistance and electrical properties, extremely low permeability and excellent against the effects of UV and gamma radiation.

ECTFE offers excellent fire protection without flame-retardant additives (V-O rating according to the UL-94 vertical flame test).

ECTFE is not subject to chemically induced stress cracking from strong acids, bases, or solvents; is the best material for handling sodium hypochlorite and is compliant with USP Class VI.

ECTFE

CRN Registered Consult Chemline

PRODUCT RANGE (ODmm)[1]

PIPE:	20 – 110
BUTT FUSION FITTINGS:	20 – 110
VALVES:	20 – 63
ACCESSORIES (FLANGES):	20 – 110

Permissible Operating Pressures

Operating Temperature °C	Operating Temperature °F	Operating Period Years	Permissible Operating Pressure SDR 33 PN 10 psi	SDR 33 PN 10 bar	SDR 21 PN 16 psi	SDR 21 PN 16 bar
10	50	50	95	6.6	153	10.6
20	68	50	83	5.8	134	9.2
30	86	50	72	5.0	116	8.0
40	104	50	62	4.2	98	6.8
50	122	50	51	3.5	82	5.7
60	140	25	43	3.0	70	4.8
70	158	25	35	2.4	57	3.9
80	176	25	28	1.9	44	3.0
90	194	15	22	1.5	35	2.4
95	203	10	18	1.3	31	2.2

CHEMLINE PLASTICS LTD

AirPro® Compressed Air Piping System

AirPro®

characteristics

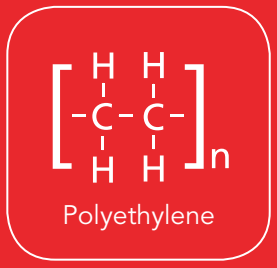
- Excellent resistance to compressor oils and moist ambient air
- Excellent stress cracking resistance
- High impact resistance
- High abrasion resistance
- Wide temperature range (–50°C to 60°C)
- Very good weldability
- Installation is fast, flexible and low cost
- Corrosion resistance
- Low frictional resistance
- Lower flow noise level

applications

- Food
- Packaging
- Mining
- Engineering
- Automotive
- Transportation
- Construction
- Laboratories
- Maintenance workshops
- Other manufacturing and processing operations
- Semiconductor

temperature range

- –50 to 60°C (–58 to 140°F)



AirPro®piping systems are specifically designed for compressed air. It is made of blue high density polyethylene (HDPE) resin. AirPro®is extremely ductile, light weight, corrosion resistant, and has minimal system pressure drop. Installation is faster, more flexible and installed cost is lower than metal systems.

AirPro®is not affected by condensate and moist environments which cause most metal systems to scale, pit or corrode, resulting in increased system pressure drop. It is chemically resistant to synthetic and mineral oils in the air released by compressors[2].

[2] Consult factory for actual recommendations.

quick + easy installation

The AirPro® light weight design allows for easy installation. The system is assembled using socket fusion equipment for joining thermoplastics. Hand held and bench machine welders are available from Chemline for purchase or rent. 1/2" to 1-1/4" is easily welded manually. For larger sizes it is recommended to use a bench machine. No previous welding experience is required. Electro fusion couplings are available for hard to reach areas.

AirPro

CRN Registered Consult Chemline

PRODUCT RANGE (ODmm)[1]

PIPE:	20 – 110
ELECTRO FUSION FITTINGS:	20 – 110
SOCKET FUSION FITTINGS:	20 – 110
VALVES:	20 – 110
ACCESSORIES (FLANGES):	20 – 110

Permissible Operating Pressures

Operating Temperature °C	Operating Temperature °F	Operating Period Years[1]	Permissible Operating Pressure SDR 7.4 PN 16 psi	Permissible Operating Pressure SDR 7.4 PN 16 bar
20	68	50	230	16.0
30	86	50	200	14.0
40	104	50	180	12.5
50	122	15	165	11.4
60	140	5	140	9.8

[1] Range varies depending on specific fitting. See price list for details.

MineLine Piping System

MineLine

characteristics

- Excellent abrasion resistance
- High chemical resistance
- Low frictional resistance
- Good weldability
- High Operating Temperature (Mineline PPR)
- Low specific weight
- Good Elasticity

applications

- Slurries
- Dewatering
- Tailings

temperature range

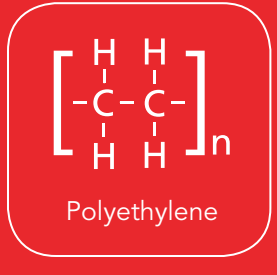
MineLine PE:

- –50 to 30°C (–58 to 86°F)

MineLine PPR:

- –20 to 90°C (–4 to 194°F)

Polypropylene



Polyethylene

The Chemline PE and PP Mineline piping features excellent abrasion resistance superior to that of any other plastic, steel and lined/unlined concrete pipes in mining slurry applications. An extended operating temperature range, chemical resistance and bonded layers of similar materials means that pressure ratings are met, abrasion is reduced and UV attack is minimized. Welding and installation is quick and easy, ensuring a long service life with very little down-time. Delamination and stress due to differential expansion rates are also eliminated.

PP PE

PP PRODUCT RANGE (ODmm)[1]

PIPE:	20 – 315
BUTT FUSION FITTINGS:	20 – 315
ELECTRO FUSION FITTINGS:	20 – 315
ACCESSORIES (FLANGES):	20 – 315

PE PRODUCT RANGE (ODmm)[1]

PIPE:	63 – 400

Permissible Operating Pressures for MineLine Polypropylene

Operating Temperature °C	Operating Temperature °F	Operating Period Years	Permissible Operating Pressure SDR 11 PN 10 psi
10	50	50	211
20	68	50	180
30	86	50	152
40	104	50	128
50	122	50	108
60	140	50	89
70	158	50	59
80	176	25	44
95	203	10	30

Permissible Operating Pressures for MineLine Polyethylene

Operating Temperature °C	Operating Temperature °F	Operating Period Years	Permissible Operating Pressure SDR 17.6 PN 6 psi	Permissible Operating Pressure SDR 11 PN 10 psi
10	50	50	138	220
20	68	50	116	186
30	86	50	97	157
40	104	50	84	135
50	122	15	68	110
60	140	5	56	89
70	158	2	45	72

CHEMLINE PLASTICS LTD

Dual Containment Piping Systems

Dual Containment

characteristics

Dual-containment is suitable for many applications, especially where requirements include high chemical resistance:

- Wide range of materials, sizes and combinations to suit each application
- Materials can be changed partway through a system to suit media and pressure changes throughout the entire system
- Wide range of high-quality fittings designed to maintain system alignment and assist installation
- Butt welding system eliminates the use of costly electrofusion couplings
- Specialty fittings and components enhance ease of installation and utilization of the system

applications

- Industrial and chemical processing waste lines
- Pressurized transfer lines
- Pharmaceutical plants
- Steel mills and plating shops
- Waste treatment
- Sulfuric acid or caustic soda
- Bulk storage of chemicals such as sodium hydroxide and aluminum nitrate
- Sulfuric, nitric, and hydrofluoric acids for wet stations in semiconductor plants
- Sewage systems for pharmaceutical wastewater

temperature range

Refer to individual material brochures for specific operating temperatures.

Dual-containment systems are engineered to protect our eco-system from the dangers of exposed aggressive chemicals. They should be specified in areas where there are chemicals transported above work stations, underground or for any other potential safety hazards due to exposure to the media. Dual-Containment is available in PE, PP, PVDF, and ECTFE for containment (outer) pipes and carrier (inner) pipes. This mix and match feature allows system designers to specify pipe material and ratings based on media and pressure changes throughout an entire system.

welding methods

The welding methods used depend on the combination of the containment pipe and carrier pipe.

Staggered welding is used when containment pipe and the carrier pipe are made of different materials and therefore have different welding parameters (time, temperature and pressure). The carrier pipe will be welded first before the containment pipe.

Simultaneous welding is used when both containment pipe and carrier pipe are made of the same material and therefore have similar welding parameters (time, temperature and pressure).

system components

Containment Pipe – Provides leak protection
Carrier Pipe – Transportation of the media
Anular Space – Area between the carrier and containment pipes where leak detection takes place
Leak Detection System – Sensor and indicator

leak detection

An important aspect of dual-containment systems is the specification for leak detection, especially in buried systems. Pressurized systems should have automated leak detection wired to shut-off valves in case a leak is detected. Drainage system should have at least a manual leak-detection system in place.

Leak Detection Systems Types:

Manual – Manual operation, locates leaks within a zone, is cost effective and relatively simple engineering
Electronic Low-Point – Automated operation, locates leaks within a zone, is cost effective and relatively simple engineering
Continuous Cable – Precise automated detection for leaks and requires more engineering for installation

PP | ECTFE | PE | PVDF

PRODUCT RANGE (ODmm)[1]

PIPE:	90/32 – 355/250
BUTT FUSION FITTINGS:	90/32 – 355/250
DOG BONES:	90/32 – 355/250
SUPPORT DISCS/SPIDER CLIPS:	90/32 – 355/250

Simultaneous Welding Standard Sizes & Materials

Containment/Carrier	Pipe Size (mm)	
	Containment	Carrier
PP/PP PE/PE	90	32
	110	63
	160	90
	160	90
	200	110
	200	110
	280	160
	315	200
	355	250

Staggered Welding Standard Sizes & Materials

Containment/Carrier	Pipe Size (mm)	
	Containment	Carrier
PE/PP, PE/PVDF PP/PVDF PE/ECTFE	90	32
	125	63
	160	90
	200	110
	280	160

Other configurations available on request.

CHEMLINE PLASTICS LTD

Thermoplastic Manifolds

Manifolds

applications

- Waste water treatment systems
- Waste treatment systems
- Ice rinks
- Minerals processing
- Soil remediation
- Mixing tanks in fish farms
- Solar water heating

approvals

- Available in NSF-61 approved material for water purification equipment or NSF-pw approved material for potable water use
- Canadian Food Inspection Agency approved for use with food products (PVDF only)

Chemline thermoplastic manifolds are fabricated using butt fusion, not hot air hand welding or socket fusion. Saddles are welded by a CNC machine. The resulting product is stronger, more reliable and cost effective. Dimensional tolerances are tighter also.

PVC | CPVC | PP | ECTFE | PE

PRODUCT RANGE (ODmm)

PIPE:	90 – 280	(3" – 12")
BRANCH:	20 – 110	(1/2" – 4")[1]

cnc welding technology offers

Exact Weld Temperatures, Pressures and Times are Controlled

- Better weld quality and resulting reliability

Dimensions are Controlled Exactly

- Precise dimensional tolerances for spigot spacing, orientation and offsets

Welding Parameters are Recorded and Downloadable (heat, pressure, operation times for heat soak, cooling, etc.)

- Manufacturing traceability and quality assurance

Repeatable Manufacturing Process

- An identical replacement manifold of the same quality can be made years later

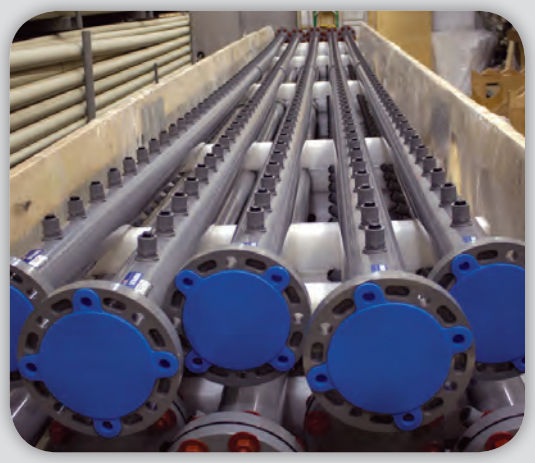
other features

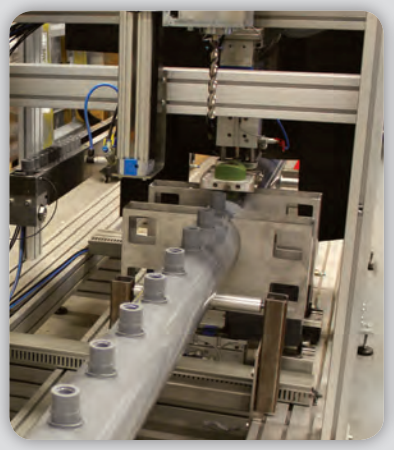
Pressure Tested

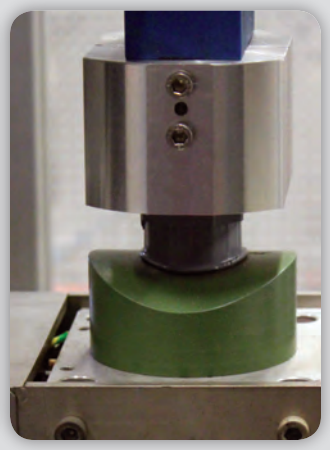
- For quality assurance

Unlimited Branch Options

- Spigot, threaded, flanged, hosebarbs, ends for valves, installation adaptors for flow meters, multiple branch rows and different port sizes







[1] 1-to-3 rule, the branch size should not be bigger than 1/3 of the manifold pipe size

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