

General Grade Polypropylene Single Wall Piping
Technical Submittal
Proline 150

Submitted by
Asahi/America, Inc.

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General Grade Polypropylene Technical Submittal

A. GENERAL

The following is the formal submittal from Asahi/America for supplying the General Grade Polypropylene pipe, valve and fitting system. The submittal is inclusive for all dimensions offered.

B. PRODUCTS

1. Resins

All Proline pipe and fittings supplied meet the requirements for Type II copolymer Polypropylene material according to ASTM D 4101.

The following chart provides data on the physical properties of the PP material

Proline Polypropylene Physical Properties

Characteristic	Standard	Units	Value
Density	ASTM D 792	g/cm ³	0.905
Tensile Stress at yield	ASTM D 638	PSI	3046
Ultimate Tensile strength	ASTM D 638	PSI	5800
Elongation at break	ASTM D 638	%	800
E-modulus	ASTM D 790	PSI	116000
Impact Strength (notched) Charpy impact test)	ISO/R 179	ft-lb./in	470
Vicat softening temperature	ISO 306	° C	125
		° F	257
Heat deflection Temperature	ISO 75 Method A	° C	45
		° F	113
Thermal Conductance	ASTM D 177	BTU-in/hr•ft ² •° F	1.2
Coefficient of thermal expansion	DIN 53 453	° R - 1	8.33x10 ⁻⁵
Specific Volume Resistivity	ASTM D 257	Ohm cm	> 10 ¹⁶
Surface Resistivity	DIN 53 482	Ohm	> 10 ¹³
Dielectric Strength	ASTM D 149	kv/mm	75
Burning rate	UL94	----	V-2

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2. Product

Pipe

Pipe shall be produced in accordance with the requirements of ASTM D2837-85 for establishing a hydrostatic design basis. In addition, the pipe shall have a standard dimensional ratio of 11 with a wall thickness to meet or exceed 150 psi at 68 F for all diameter sizes.

Pipe is produced under strict ISO9001 approved standards.

Fittings

Pressure fittings shall conform to the same requirements as pipe as outlined above. All pressure fittings are injection molded, unless called out separately by Asahi/America.

Fittings are produced under strict ISO9001 Approved standards

Valve Options:

Diaphragm Valves: All Valves 1/2" - 2" are the Type 342 from the Proline system . Valves are 150psi rated, weir style PP body, PPG bonnet and a PTFE diaphragm with an EPDM backing. Valves shall be designed with a position indicator and a locking handle standard with pad lock shut out standard.

Valves shall be single body design with butt-fusion ends. Valves are for water service

Diaphragm Valves for aggressive chemical: All Valves 1/2" - 4" are the Type 14 supplied by Asahi/America, Inc.. Valves are 150psi rated, weir style PVDF body, PP bonnet and a PTFE diaphragm with an EPDM backing.

Valves shall be designed with a position indicator. All Valves shall have PVDF Gas barrier between the PTFE diaphragm and the EPDM backing. Valves shall be true union style for 1/2" – 2" or flange for 1/2" – 4"

Butterfly Valves: All sizes 1 1/2" - 12" shall be a class 150 lug style PVC, PP or PVDF body. Seat liner and seals shall be Viton or platinum chloride cured silicone. Disc shall be PVDF as outlined above. 316 SS lugs mounted into the body are optional from the manufacturer.

Check Valves: All sizes class 150, ball type PVDF body with Viton seat and seals. 230 PSI at 73.4°F for sizes 1/2" through 2-1/2" nominal PSI at 73.4°F for sizes above 2-1/2" nominal.

Consult Asahi/America Valve technical literature for the pressure rating for each valve by size and type.

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Pressure Ratings (pipe and molded fittings)

Standard Rating

SDR 11: 150 psi at 68 °F

Pressure Rating Correction Chart

Temperature	Temperature	Correction
° F	° C	Factor
73	22.7	1.00
100	37.7	0.64
140	60.0	0.40
180	82.2	0.28
200	93.3	0.10

Multiply the nominal pressure rating of the pipe by the correction factor.

Valve pressure ratings are based on the valve material and style. See Asahi/America valve literature for pressure rating by size, style and material.

D. Hanging Criteria

It is recommended to hang all Proline pipelines in a manner that prevents point loads. Hangers that hold 360° around the pipe are recommended over a U-Bolt hanger.

PP Support Spacing Recommendation

Nominal Size	68° F 20° F	86° F 30° F	104° F 60° F	122° F 50° F	140° F 60° F	158° F 70° F	176° F 80° F
1/2"	3	2.5	2.5	2	2	2	2
3/4"	3	3	2.5	2.5	2.5	2.5	2
1"	3.5	3	3	3	3	2.5	2.5
1 1/2"	4	3.5	3	3	3	3	3
2"	4.5	4	4	3.5	3	3	3
2 1/2"	5	4.5	4	4	3.5	3	3
3"	5.5	5	4	4	4	3.5	3.5
4"	6	5	5	4	4	4	4
6"	7	6	6	5	5	4.5	4.5
8"	7.5	7	6	6	5.5	5	5
10"	8.5	7.5	7	6.5	6	6	5.5
12"	9.5	8.5	8	7	7	6.5	6
14"	10	8.5	8	7.5	7	6.5	6.5
16"	10.5	9.5	8.5	8	7.5	7	6.5
18"	11.5	10	9	8.5	8	7.5	7

Dimensional Catalog

Enclosed is a copy for pipe and fittings. The catalog includes dimensions on all pipe and fittings, both socket and butt-fusion. Also available is a listing of non-standard machine fittings available for special needs.

3. Quality Control

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Asahi/America, Inc. is capable of providing quality assurance certifications on all components based on lot numbers and manufacturing dates. If certifications are necessary notify Asahi/America at time of order, lot numbers are recorded on orders that are requested. All certifications will be supplied by mail after material has been shipped.

C. Execution

1. Material Storage

All components received for installation shall be kept in original shipping containers. Receivers should verify the condition of the materials after shipment at this point. Any discrepancies should be addressed with Asahi/America immediately.

Materials should then be stored in a sheltered location protected from sunlight and rain to prevent damage and contamination.

Pipe should be stored horizontally in its original protective tubes. Each tube will be labeled with its contents, therefore eliminating the need to open the tube until the material is to be fabricated. Tubes should be supported every three feet or less. Pipe should not be stacked more than three to four feet in height. If multiple sizes are to be stored, the larger diameters should be placed on the bottom and lighter smaller diameters on the top.

Fittings should be kept in original boxes.

2. Manufacturer Representation

On each pipe installation Asahi/America is available to be on site at the time of job start-up to provide training on use of supplied welding equipment. The time required for on-site supervision shall be negotiated during the bid process. Any time beyond the negotiated amount will be billed to the contractor on a time and expense basis. Asahi/America's extensive field representation through our distribution network and our field technicians can provide almost immediate field assistance for emergencies to reduced any down time.

Training will consist of Asahi/America personnel or a certified representative to fully educate installers on the welding tools. Each welder will be required to demonstrate the full process of welding. The process includes: set up of the tool, loading of the pipe and/or fittings, alignment of the tool, and the weld process. Training will also include minor maintenance techniques to keep tools in ideal operating conditions. After an operator has demonstrated his or her ability to operate the equipment, Asahi/America will issue a certified welders card for the equipment being used. It is important that the factory certified all welders per job to avoid any misunderstandings.

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3. Recommended Welding Techniques -Butt, Socket, Non-Contact

The following section outlines four welding methods available from Asahi/America. Each method has its benefits for various applications. In each case Asahi/America has the equipment and expertise to provide the welding method you demand.

A. Conventional Butt-Fusion

All pipe, valve, and fitting joints are to be prepared using the butt-fusion technique as outlined in ASTM D-2657, Section 9. The welding equipment is to be rented or purchased from Asahi/America. Proper equipment selection should be based on pipe size and site conditions. For assistance on tool selection, Asahi/America should be consulted. For Butt-Fusion Asahi/America offers the following:

- The 4" Proweld shop - for sizes 1/2" - 4"
- The 6" Proweld shop - for sizes 1 1/2" - 6"
- The 10" Proweld shop - for sizes 1 1/2" - 10"

Butt Fusion Welding Parameters:

Nominal Size	Pressure Rating (lb. force)	Initial Melt Pressure (lb. force)	Melt Pressure (lb. force)	Heat Soak Time (secs)	Change Over Time (secs)	Final joining Pressure (min.)	Cool Down time (Min)
1/2"	150 psi	3	1	25	3	3	3
3/4"	150 psi	4	1	25	3	4	3
1"	150 psi	6	1	25	3	6	4
1 1/4"	150 psi	9	1	30	4	9	5
1 1/2"	150 psi	14	1	35	4	14	6
2"	150 psi	23	2	45	5	23	7
2 1/2"	150 psi	33	2	55	7	33	9
3"	150 psi	46	3	60	8	46	10
4"	150 psi	69	3	80	9	69	13
6"	150 psi	148	10	100	10	148	16
8"	150 psi	230	15	160	10	230	23
10"	150 psi	359	30	200	10	359	29

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B. Socket Fusion

All pipe, valves, and fittings are to be prepared using the socket-fusion technique as outlined in ASTM D-2657, Section 8. The welding equipment is to be rented or purchased from Asahi/America. Proper equipment selection should be based on pipe size and site conditions. For assistance on tool selection, Asahi/America should be consulted. For socket-fusion Asahi/America can offer the following equipment:

- 2" Hand Held Proweld Socket-Fusion Tool - for sizes 1/2" - 2"
- 4" Bench Socket-Fusion Tool - for sizes 3/4" - 4"

The welding parameters for Proline, Air Pro and PVDF piping assembled using the socket-fusion method are in the table below.

Pipe Ø inch	½	¾	1	1 ¼	1 ½	2
Pipe Ø mm	20	25	32	40	50	63
Heating time for Pro 150 (seconds)	5	7	8	12	18	24
Heating time for Air Pro (seconds)	5	7	8	12	19	24
Heating time for PVDF (seconds)	3	4	5	6	8	10

Welding temperature = 260° C or 500° F

C. Non-Contact Butt-Fusion

All pipe, valves, and fittings are to be prepared using the Radiant Heat Butt-Fusion technique as outlined in ASTM D-2657 and according to the Asahi/America operation methods for non-contact butt-fusion methods.

Proper equipment selection should be based on installation requirements and line sizes.

The UF2000 Series

All UF2000 Non-Contact Butt-Fusion equipment shall possess a minimum of the following capabilities:

1. Semi Automated Welding Process.
2. Ability to store welding data internally on computer memory up to 1000 welds.
3. Full alignment capabilities (vertical and horizontal).
4. All metal components coated to prevent any particle generation from metals.
5. Ability to download all welding information to a personal computer.
6. Protective hood over welding area. (1/2" – 2" model)
7. Nitrogen Purge of the welding area.
8. Automatic Nitrogen purge of the pipeline.
9. Security Card Entry.
10. Printer Labels for each weld automatically.

Asahi/America offers the following Non-Contact butt-fusion tools for purchase or rental.

- The UF2000/1 - for sizes 1/2" - 2"

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The UF2000/2 - for sizes 2 ½" – 10"

The SP Series

All SP Non-Contact Butt Fusion equipment shall possess the following features and capabilities

1. Automated Welding Process
2. Computer Touch Screen for weld set-up and operation
3. Complete documentation of the entire weld process on each weld
4. Full alignment capabilities (vertical and horizontal)
5. Data Down load capability.
6. PCMCIA Card secured operation
7. Printer labels for each weld automatically.
8. Magnetic Clamps

Asahi/America offers the following Non-Contact butt fusion tools for purchase or rental.

- The SP110 for sizes ½" – 4"
 The SP 250 for sizes 2 ½" – 10"

4. Suggested Work Facilities and Tools Facility

Subassembly and fabrication work should be conducted in a separate location from other operations. Equipment, such as Allen heads, wrenches, etc, should be dedicated to the plastic pipe installation.

Field welding is also an acceptable welding practice. Precautions should be taken to accommodate equipment in terms of protecting it from the elements and damage. Clarification to tool operation and maintenance will be handled at the time of job start-up.

Tools

All fusion tools utilized and necessary miscellaneous tools are to be dedicated for clean build only, and should be kept separate. Special attention should be given to the fusion tools to prevent the possibility of contaminating a weld.

The contractor shall lease or purchase all necessary welding equipment from Asahi/America. At the end of the installation, any necessary equipment needed onsite should be sold to the owner. Contractor is responsible for proper maintenance and care of the fusion tools during construction. In the event of any unusual equipment malfunction. Asahi/America is to be notified prior to any repair.

5. Testing Procedures

Prior to pressure testing, the system shall be examined for the following items:

- A. Pipe shall be completed per drawing layout with all pipe and valve supports in place.
- B. Pipe, valves, and equipment shall be supported as specified, without any concentrated loads on system.
- C. Pipe shall be in good conditions, void of any cracks, scratches, or deformation.
 - a. Pipe flanges shall be properly aligned. All flange bolts should be checked for correct torques.

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b. All joints should be reviewed for appropriate welding technique.

1. **Butt**
To have two beads, 360° around the joint.
2. **Socket**
To have two beads on the end of the fitting and on the outside of the pipe in contact, 360° around the joint.
3. **UF2000 and SP series**
Identify labels shall identify weld certification by the print “welding OK”. Joints should have two beads 360° around the joint. Also refer to manufacturers separate weld inspection criteria, supplied separately by Asahi/America.

If any deficiencies appear, the quality control engineer shall provide directions/repair.

Pressure Test

1. Test fluid should be deionized water, with quality level set by Quality Control Engineer. In all cases test must be done hydrostatically. Air is not acceptable.
2. Filling the system: Open the valves and vents to purge the system of any air. Slowly inject the water into the system, making sure that air does not become trapped in the system.
3. Begin pressurizing the system in increments of 10 PSI. Bring the system up to 100 PSI and hold. Allow system to hold pressure for a minimum of two hours and up to a recommended 12 hours. Check pressure gauge after one hour. Due to natural creep effects in plastic piping, the pressure will have decreased. If drop is less than 10 psi pump the pressure back up. At this time, the system may be fully pressurized to desired test pressure.
4. If after one hour the pressure has decreased more than 10%, consider the test a failure. Note the 10% value may need to be greater for larger systems. Also note that Step 3 may need to be conducted several times if there are significant thermal changes.
5. Test is to be witnessed by Quality Control Engineer, and certified by the contractor.
6. Obvious leaks can be found by emptying the system and placing a 5 PSI charge of clean, dry nitrogen on the system. Each joint should then be individually checked using a soapy water solution or an Ultrasonic leak detection gun. Leak detection guns are available from Asahi/America. When using compressed air, extra safety precautions for surrounding personnel must be applied. In no case should compressed air be used as the primary test method. Compressed air should be applied at temperatures above 32 °F.