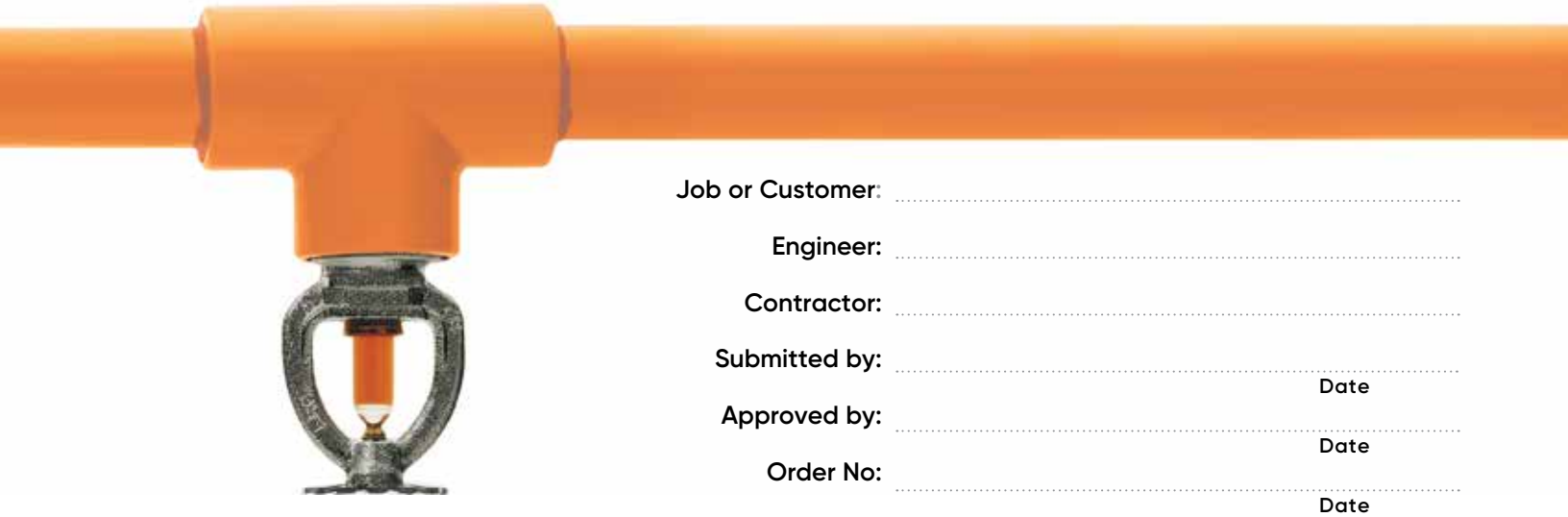
BlazeMaster®
FIRE PROTECTION SYSTEMS

Submittal Data Sheet



Job or Customer: .....

Engineer: .....

Contractor: .....

Submitted by: ..... Date

Approved by: ..... Date

Order No: ..... Date

Specification: .....

Installation Date: .....

< STANDARDS >

D1784, F437, F438, F439, F442

1821
1887

C199 P-M

NSF-61

FM

13, 13R
13D, 90A
24

introduction

IPEX BlazeMaster® pipe and fittings are designed specifically for fire sprinkler systems. They are made from a specialty thermoplastic known chemically as post-chlorinated polyvinyl chloride (CPVC). IPEX BlazeMaster pipe and fittings provide unique advantages in sprinkler installations including superior hydraulics, ease of joining, increased hanger spacing in comparison to other thermoplastics and ease of assembly. They also are based on a technology with a continuous and proven service history of more than 40 years.

Fire Performance

BlazeMaster is made with CPVC which offers an even greater fire safety profile than PVC. Like PVC, CPVC will not independently support combustion, and as such will not burn once the flame source is removed. CPVC's ignition resistance is demonstrated by its flash ignition temperature of 900°F.

CPVC also has a low flame spread. In addition, it provides outstanding smoke characteristics. In testing conducted to CAN/ULC S102.2, CPVC showed a flame spread of less than 15, and a smoke-developed classification of 15. And, like PVC, CPVC has a fuel contribution of 0.

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material properties

Physical & Thermal Properties of BlazeMaster CPVC		
Property	CPVC	ASTM
Specific Gravity	1.55	D792
IZOD Impact Strength (ft. lbs./inch, notched)	3.0	D256A
Modulus of Elasticity, @ 73°F, psi	4.23×10^5	D638
Ultimate Tensile Strength, psi	8,400	D638
Compressive Strength, psi	9,600	D695
Poisson's Ratio	.35 - .38	-
Working Stress @ 73°F, psi	2,000	D1598
Hazen-Williams C Factor	150	_
Coefficient of Linear Expansion in./(in.°F)	3.4×10^{-5}	D696
Thermal Conductivity BTU/hr./ ft.²/°F/in.	0.95	C177
Limiting Oxygen Index	60%	D2863
Electrical Conductivity	Non Conductor	

availability

Description	Size (in)
Pipe	3/4 to 3"
Fittings	
Tee (Soc)	3/4" to 3"
Reducing Tee (Soc)	3/4" to 3" x 3/4" 3" x 3/4" to 2-1/2"
Sprinkler Head Adapter Tee (Soc x Soc x SST FPT)	3/4" to 2" x 3/4" 2" x 1/2"
Sprinkler Head Adapter Tee (FPT x FPT x Soc)	1/2" x 1/2" 1"
90° Elbow (Soc)	3/4" - 3"
Sprinkler head Adapter 90° Elbow (Soc x SST FPT)	3/4" to 1-1/4" x 1/2" to 3/4"
45° Elbow (Soc)	3/4" to 3"
Cross (Soc)	3/4" to 2-1/2"
Coupling (Soc)	3/4" to 3"
Grooved Adapter Coupling (Soc x Groove)	1-1/4" to 3"
Female Adaptor (Soc x SST FPT)	3/4" to 2"
Sprinkler Head Adaptor (Soc x SST FPT)	3/4" to 1-1/4" x 1/2" to 3/4"
Sprinkler Head Adaptor (Sp x SST FPT)	3/4" to 1" x 1/2"
Reducer Bushing (Spig x Soc)	1" to 3" x 3/4" to 2-1/2"
Cap (Soc)	3/4" to 3"
Union (Soc)	3/4" to 2"
One Piece Flange (Soc)	3/4" to 3"

Handling & Installation Procedures

Outdoor Installations

IPEX BlazeMaster pipe and fittings are not listed for exposed, outdoor applications.

Joining IPEX BlazeMaster Pipe and Fittings with Red One Step Solvent Cement

Note: BlazeMaster BM-5 One Step Cement requires no cleaner or primer. Refer to individual manufacturers' installation instructions.

Cutting

IPEX BlazeMaster pipe can be easily cut with a sharp ratchet cutter (except at temperatures below 10°C (50°F)), a wheel-type plastic tubing cutter, a power saw or a fine toothed saw. To ensure the pipe is cut square, a miter box is recommended when using a saw. A square cut provides the surface of the pipe with maximum bonding area. If any indication of damage or cracking is evident at the pipe end, cut off at least 50.8 mm (2") beyond any visible crack.

Deburring

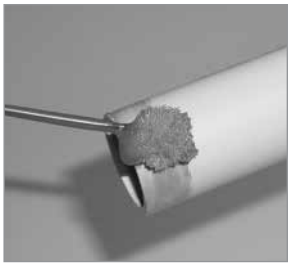
Burrs and filings can prevent proper contact between pipe and fitting during assembly, and must be removed from the outside and the inside of the pipe. A chamfering tool or a file is suitable for this purpose. A slight bevel shall be placed at the end of the pipe to ease entry of the pipe into the socket and minimize the chances of wiping solvent cement from the fitting during insertion.

Fitting Preparation

Using a clean, dry rag, wipe loose dirt and moisture from the fitting socket and pipe end. Moisture can slow the cure time and at this stage of assembly, excessive water can reduce joint strength. Check the dry fit of the pipe and fitting. The pipe should enter the fitting socket easily 1/4 to 3/4 of the way. At this stage, the pipe should not bottom out in the socket.

Solvent Cement Application

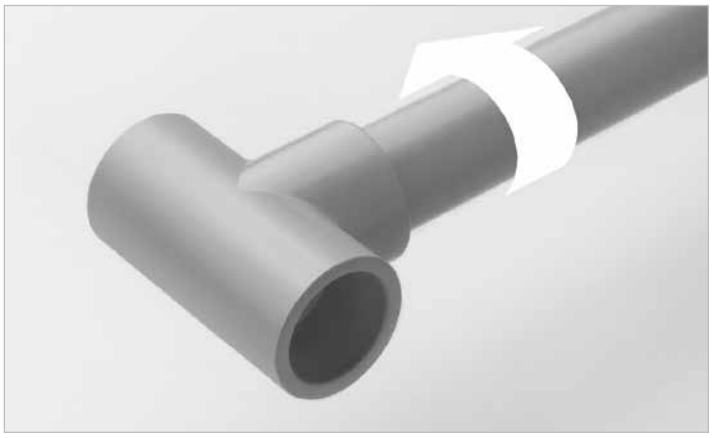
Joining surfaces shall be penetrated and softened. Cement shall be applied (worked into pipe) with an applicator half the nominal size of the pipe diameter. Apply a heavy, even coat of cement to the outside pipe end. Apply a medium coat to the fitting socket. Pipe sizes 1-1/4" (32 mm) and above shall always receive a second cement application on the pipe end. (Apply cement on the pipe end, in the fitting socket, and on the pipe again.) Only use solvent cements that have been specifically investigated and tested for use with BlazeMaster CPVC systems and approved by the pipe and fitting manufacturer. Too much cement can cause clogged waterways. Do not allow excess cement to puddle in the pipe and fitting assembly.



Special care shall be exercised when assembling BlazeMaster systems in extremely low temperatures (below 4°C (40°F)) or extremely high temperatures (above 38°C (100°F)). Extra set time shall be allowed in colder temperatures. When cementing pipe and fittings in extremely cold temperatures, make certain that the cement has not "gelled". Gelled cement must be discarded. In extremely hot temperatures, make sure both surfaces to be joined are still wet with cement when putting them together.

Assembly

After applying cement, immediately insert the pipe into the fitting socket, while rotating the pipe one-quarter turn. Properly align the fitting for the installation at this time. Pipe must bottom to the stop. Hold the assembly for 10 to 15 seconds to ensure initial bonding. A bead of cement should be evident around the pipe and fitting juncture. If this bead is not continuous around the socket shoulder, it may indicate that insufficient cement was applied.



If insufficient cement is applied, the fitting must be cut out and discarded.

Cement in excess of the bead can be wiped off with a rag. Care shall be exercised when installing sprinkler heads. Sprinkler head fittings shall be allowed to cure for a minimum of 30 minutes prior to installing the sprinkler head. When installing sprinkler heads, be sure to anchor or hold the pipe drop securely to avoid rotating the pipe in previously cemented connections. Previously cemented fittings shall also be permitted to cure for a minimum of 30 minutes.

Warning: Sprinkler heads shall be installed only after all the CPVC pipe and fittings, including the sprinkler head adapters, are solvent welded to the piping and allowed to cure for a minimum of 30 minutes. Sprinkler head fittings should be visually inspected and probed with a wooden dowel to ensure that the water way and threads are clear of any excess cement. Once the installation is complete and cured per Table I, II or III, the system shall be hydrostatically tested. Sprinklers shall not be installed in the fittings prior to the fittings being cemented in place.

Note: Safety and Health Precautions. Prior to using CPVC solvent cements, review and follow all precautions found on the container labels, material safety data sheet, and Standard Practice for Safe Handling ASTM F 402.

Set and Cure Times

Solvent cement set and cure times are a function of pipe size, temperature, relative humidity, and tightness of fit. Curing time is faster for drier environments, smaller pipe sizes, higher temperatures and tighter fits. The assembly must be allowed to set, without any stress on the joint, for 1 to 5 minutes, depending on pipe size and temperature. Following initial set period, the assembly can be handled carefully, avoiding significant stresses to the joint. Refer to the following tables for minimum cure times prior to pressure testing.

Table I: 552 kPa (225 psi) Test Pressure (maximum) Ambient Temperature During Cure Period

Pipe Size		Temperature		
inches	mm	16°C to 49°C (60°F to 120°F)	≥ 4.4°C (≥ 40°F)	≥17.8°C (≥ 0°F)
3/4	20	1 hr	4 hrs	48 hrs
1	25	1-1/2 hrs	4 hrs	48 hrs
1-1/4	32 & 40	3 hrs	32 hrs	10 days
2	50	8 hrs	48 hrs	Note 1
2-1/2 & 3	65 & 80	24 hrs	96 hrs	Note 1

Note: Cure times indicated in Table 1 are to be used for all LPCB approved pipe and fitting joints.

Table II: 1379 kPa (200 psi) Test Pressure (maximum) Ambient Temperature During Cure Period

Pipe Size		Temperature		
inches	mm	16°C to 49°C (60°F to 120°F)	≥ 4.4°C (≥ 40°F)	≥17.8°C (≥ 0°F)
3/4	20	45 mins	1-1/2 hrs	48 hrs
1	25	45 mins	1-1/2 hrs	48 hrs
1-1/4	32 & 40	1-1/2 hrs	16 hrs	10 days
2	50	6 hrs	36 hrs	Note 1
2-1/2 & 3	65 & 80	8 hrs	72 hrs	Note 1

Table III: 690 kPa (100 psi) Test Pressure (maximum) Ambient Temperature During Cure Period

Pipe Size		Temperature		
inches	mm	16°C to 49°C (60°F to 120°F)	≥ 4.4°C (≥ 40°F)	≥17.8°C (≥ 0°F)
3/4	20	15 mins	15 mins	30 mins
1	25	15 mins	30 mins	30 mins
1-1/4	32 & 40	15 mins	30 mins	2 hrs

Note: For these sizes, the solvent cement can be applied at temperatures below -17.8°C (0°F), however, the sprinkler system temperature must be raised to a temperature of 0°C (32°F) or above and allowed to cure per the above recommendations prior to pressure testing.

Threaded Connections

IPEX BlazeMaster CPVC female threaded adapters or flanges are listed for connecting a BlazeMaster fire sprinkler system to other materials, valves, and appurtenances.

A thread sealant shall be used in making threaded connections. TFE (Teflon®) thread tape is the recommended sealant. Some thread sealants other than TFE thread tape contain solvents or other materials that may be damaging to CPVC. Contact your authorized IPEX BlazeMaster distributor or IPEX Representative for approved thread sealants. Use of thread sealants other than those approved by IPEX will void the warranty on the IPEX BlazeMaster system.

Care shall be exercised when transitioning between IPEX BlazeMaster pipe and fittings and metal. Care must be taken to avoid over-torquing. Refer to section on instructions for torque requirements.

The following is the recommended method of installation to ensure a sound connection.

a) Begin by applying 2 to 3 wraps of TFE (Teflon®) thread tape.

b) Tighten the sprinkler head into the adapter taking care not to cross-thread the fitting. (Recommended torque values 15-25 ft/lbs)

c) Two to three turns beyond finger-tight is all that is required to make a sound plastic threaded connection.

CAUTION: Over-tightening will damage both the pipe and the fitting.

Flanged Connections

Flange Make-Up: Once a flange is joined to pipe, the method for joining two flanges is as follows:

1. Piping runs joined to the flanges must be installed in a straight line position to the flange to avoid stress at the flange due to misalignment. Piping must also be secured and supported to prevent lateral movement that can create stress and damage the flange.

2. With gasket in place, align the bolt holes of the mating flanges by rotating the ring into position. (Consideration should be given to alignment of One-Piece Flange prior to joining with pipe.)

3. Insert all bolts, washers (two standard flat washers per bolt), and nuts.

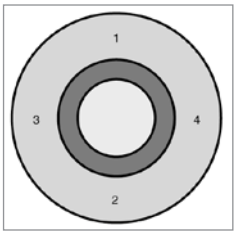
4. Make sure the faces of the mating surfaces are flush against gasket prior to bolting down the flanges.

5. Tighten the nuts by hand until they are snug. Establish uniform pressure over the flange face by tightening the bolts in 5 ft. lb. (6.8 M Kg) increments according to the sequence shown in Figure 8: Bol Tightening Sequence following a 180° opposing sequence.

6. Care must be taken to avoid "bending" the flange when joining a flange to a "raised face" flange, or a wafer-style valve. Do not use bolts to bring together improperly mated flanges.

Caution: Over-torquing will damage the flange. Torque given is for dry, non-lubricated bolt, standard washers, neoprene 3.18 mm (1/8") thick full face gasket. If lubricant (non-petroleum based) is used, torque levels may vary. Actual field conditions may require a variation in these recommendations.

Figure 8: Bolt Tightening Sequence



Recommended Bolt Torque

Flange Size		Bolt Diameter		Torque	
inches	mm	inches	mm	ft lbs	M Kg
3/4 - 1-1/2	19.05 - 38.10	1/2	12.70	10 - 15	13.6 - 20.3
2 - 3	50.80 - 76.20	5/8	15.88	20 - 30	27.1 - 40.7

Grooved Coupling Adapters

The following procedures are recommended for proper assembly of the Grooved Coupling Adapter. READ THESE INSTRUCTIONS CAREFULLY BEFORE BEGINNING INSTALLATION.

1. Inspect the fittings and pipe to insure that they are sufficiently free from indentations, projections or roll-marks on the gasket seating areas of the fitting and pipe. The pipe should be squarely cut with any loose scale, paint and/or dirt must be removed from the groove and seating surface. Use a standard grade E*, EPDM compound that is suitable for wet fire sprinkler service. A flexible coupling shall be used with grooved coupling adapters. Caution: Use of rigid style couplings may damage the grooved coupling adapter. Consult the coupling manufacturer for proper selection.

   *See manufacturer for temperature ratings.

2. Make sure the gasket is clean and free of any cracks, cuts or other defects which may cause leaks. Lubricate the gasket with a vegetable soap-based gasket lubricant. Caution: Use of petroleum based lubricants will damage the gasket and adapter resulting in stress failure of the CPVC adapter. A gasket/joint lubricant is recommended to prevent pinching the gasket and to assist in seating the gasket during the alignment process. Apply the appropriate lubricant to the gasket lips and exterior surface of the gasket.

3. Place the gasket over the metal pipe ends, being sure gasket lip does not overhang the pipe end. Insert the CPVC grooved coupling adapter into the gasket. Make sure that the gasket is centered between the two grooves. No portion of the gasket should extend into the grooves. Caution: Make sure the gasket is not pinched between the pipe and the fitting.

4. Place the metal housing over the gasket, making sure the metal housing key is into the grooves on the metal pipe and the CPVC coupling adapter. Insert the bolts and tighten by hand. Tighten the bolts alternately and equally until the bolt pads are touching metal-to-metal. In completing a proper joint, the gasket is also slightly compressed, adding to the strength of the seal from the gasket's durometer.

5. Inspect the joints before and after pressure testing. Look for gaps between the bolt pads and for housing keys that are not inside the grooves.

Penetrating Fire Rated Walls and Partitions

Before penetrating fire rated walls and partitions, consult building codes and authorities having jurisdiction in your area. Several classified through-penetration firestop systems are approved for use with CPVC pipe. Consult IPEX representative for further information. Warning: Some firestop sealants or wrap strips contain solvents or plasticizers that may be damaging to CPVC. Always consult the manufacturer of the firestop material for compatibility with IPEX BlazeMaster CPVC pipe and fittings.

Earthquake Bracing

Since IPEX BlazeMaster CPVC pipe is more ductile than metallic sprinkler pipe, it has a greater capacity to withstand earthquake damage. In areas subject to earthquakes, BlazeMaster fire sprinkler systems shall be designed and braced in accordance with local codes or NFPA 13, Section 6-4 (1999 Edition).

When it is required to earthquake brace BlazeMaster piping, it is important to use fittings, fasteners or clamps that do not have sharp edges or apply excessive compressive forces sufficient to distort the pipe.

Pressure Testing

Once an installation is completed and cured, per the previous recommendations, the system should be hydrostatically (water) pressure tested at 1379 kPa (200 psi), Table II, for 2 hours (or at 345 kPa (50 psi) in excess of the maximum pressure, Table I, when the maximum pressure to be maintained in the system is in excess of 1034 kPa (150 psi) in accordance with the requirements established by NFPA Standard 13, Section 10-2.2.1 (1999 Edition). Sprinkler systems in one- and two-family dwellings and mobile homes may be tested at line pressure, Table III in accordance with the requirements established by NFPA 13D, Section 1-5.4 (1999 Edition). When pressure testing, the sprinkler system shall be slowly filled with water and the air bled from the highest and farthest sprinkler heads before pressure testing is applied. Air must be removed from piping systems (plastic or metal) to prevent it from being locked in the system when pressure is applied. Entrapped air can generate excessive surge pressures that are potentially damaging, regardless of the piping materials used. **Air or compressed gas should never be used for pressure testing.** If a leak is found, the fitting must be cut out and discarded. A new section can be installed using couplings or a union. Unions should be used in accessible areas only.

Scope

This specification sheet covers IPEX Inc. requirements for for 3/4" through 3" (20 mm – 75 mm) **BlazeMaster CPVC SDR 13.5 Pipe** for wet pipe automatic sprinkler systems, having a rated working pressure of 175 psi (1205 kPa) at 150°F (66°C) or 315 psi (2172 kPa) at 73°F (22°C) and **BlazeMaster CPVC Schedule 80 Fittings**. The fittings, for wet pipe automatic sprinkler systems, having a rated working pressure of 175 psi (1205 kPa) at 150°F (66°C) or 315 psi (2172 kPa) @ 73°F (22°C). These products meet or exceed performance standards set by the American National Standards Institute (ANSI), the American Society for Testing and Materials (ASTM), Factory Mutual Research (FM), National Fire Protection Agency (NFPA), NSF International (NSF), Underwriters Laboratories Inc., and Underwriters' Laboratories of Canada (ULC).

Underwriters' Laboratories of Canada lists **BlazeMaster CPVC Schedule 80 Fittings** and **BlazeMaster CPVC SDR 13.5 Pipe** for use in the following applications; Residential occupancies as defined in the Standard for Sprinkler Systems in One and Two-Family Dwellings, NFPA 13D.

Multiple residential as defined in NFPA 13R.

Light-hazard occupancies as defined in the Standard for Installation of Sprinkler Systems, NFPA 13. **BlazeMaster CPVC Schedule 80 Fittings** and **BlazeMaster CPVC SDR 13.5 Pipe** can be used for both concealed and exposed installations. Refer to Ipex literature for any limitations.

Dimensions

IPEX BlazeMaster pipe is produced in SDR 13.5 dimensions to the specifications of ASTM F442. Fittings are produced to ASTM F437, F438 pr F439 specifications depending on the size and configuration.

Material

BlazeMaster CPVC SDR 13.5 Pipe are made from Lubrizol Inc. Chlorinated Polyvinyl Chloride (CPVC) raw material having a cell class of 23447 as defined in ASTM Standard D 1784 *"Standard Specification for Rigid Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Compounds"*. The compound is listed with NSF for potable water service.

The material has been tested in accordance with CAN/ULC Standard S102.2M88 *"Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Covering, and Miscellaneous Materials and Assemblies"* with the following results: Flame Spread 5 / Smoke Development 5-15.

BlazeMaster Schedule 80 Fittings are made from Lubrizol Inc. Chlorinated Polyvinyl Chloride (CPVC) raw material having a cell class of 23447 as defined in ASTM Standard D 1784 *"Standard Specification for Rigid Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Compounds"*. The compound is listed with NSF for potable water service.

Marking

BlazeMaster Schedule 80 Fittings and **BlazeMaster CPVC SDR 13.5 Pipe** are made from Lubrizol Inc. Chlorinated Polyvinyl Chloride (CPVC) raw material having a cell class of 23447 as defined in ASTM Standard D 1784 *"Standard Specification for Rigid Polyvinyl Chloride (PVC) and Chlorinated Polyvinyl Chloride (CPVC) Compounds"*. The compound is listed with NSF for potable water service.

About IPEX by Aliaxis

As leading suppliers of thermoplastic piping systems, IPEX by Aliaxis provides our customers with some of the world's largest and most comprehensive product lines. All IPEX by Aliaxis products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have earned a reputation for product innovation, quality, end-user focus and performance

Markets served by IPEX by Aliaxis products are: :

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, PVDF, PE, ABS, and PEX pipe and fittings
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

BlazeMaster® is manufactured by IPEX USA LLC. and distributed in Canada by IPEX Inc.
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