Product Data Sheet



< STANDARDS >



ASTM D4101-86 ASTM D1784 ASTM D3222



ANSI B16.5



NSF 61

IPEX FX Series Butterfly Valves offer superior strength and chemical resistance in highly corrosive environments and process flow conditions. The special trapezoid shape of the liner and a serrated body cavity guarantee a bubble tight seal while keeping break-away torque at an absolute minimum. This versatile industrial valve features double selflubricating seals, direct actuator mount capability, and the option of either a lever handle or mounted gear box. The FX lever handle includes the EasyFit labeling system for valve identification. FX Series Butterfly Valves are part of our complete systems of pipe, valves, and fittings, engineered and manufactured to our strict quality, performance, and dimensional standards.

VALVE AVAILABILITY

Body Material	Polyvinyl Chloride (PVC)
Disc Material	Polypropylene (PP), PVC
Size Range	1-1/2" through 12"
Pressure	150 psi (1-1/2" to 10"), 120 psi (12")
Seals	EPDM or FPM
Body Style	Wafer
Control Style	Lever Handle or Mounted Gear Box
Actuator Control	Double Acting Pneumatic, Spring Return Pneumatic, Electric
End Connections	Flanged (ANSI 150)



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Components

Easy Labeling System Lockable Ergonomic Handle 10 position incremental locking plate Field convertible ISO or ANSI bolt patterns PP or PVC disc available Overmolded EPDM or FPM liners for ease of installation

316 Stainless Steel Shaft

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Product Data Sheet

Accessories



B PVC Tag Holder

C EasyFit Multifunction Handle

Lever Handle

IPEX's orange lever handle is standard on all valves from 1 1/2" through to 8". The handle can be installed at 0 degrees or the 180 degree position and comes equipped with a lockout tagout point to meet jobsite safety requirements.

It is often necessary to customize a valve by labelling or tagging it in order to mark, protect and identify it.



The FX is equipped with a specially designed water resistant module for the customization of the valve. The module is housed in the handle and is composed of a transparent PVC service plug and a white tag holder. The transparent plug can be easily removed to be used for self-labelling on its blank side. Self labelling can be done in several ways, but we recommend designing and printing custom labels through the EasyFit Labelling System (LSE).





Gearbox

The Gearbox is available for all butterfly valve sizes, but comes standard on all 10" and 12" butterfly valves. This is the ideal solution for areas where there is not enough room to swing a lever handle. With a 40:1 ratio, the gearbox enables the user to manually open and close the valve with ease.

2" Square Nut Operator

The square nut is constructed of durable and corrosion resistant PVC that snaps directly on the valve stem without the need for a mounting kit. The nut allows for remote operation of a valve in a sump or trench using an extended T-wrench or key.

Silicone Free

IPEX offers a silicone free valve that is cleaned in our ISO 14644-1 clean room. Our facility utilizes a three stage chemical cleaning process to ensure all valve components are free from any traces of silicone. The valve is double bagged within a dual skin silicone free package to prevent any contamination. In addition, a non-silicone lubricant is used for our butterfly valves to maintain efficient operation over the lifetime of the system

Product Data Sheet

Factory Mounted Components

Electric Actuators

IPEX offers electric actuators from for our entire line of butterfly valves. All our electric actuators carry the IP 67 rating (Equivalent to NEMA 4X) CSA and ULC labels required for outdoor installations. Our standard units come with the following options:

- 240V DC, 120V AC or 220V AC control power
- Position Indicators
- Permanent Lubrication
- Heavy Duty Gears
- ISO 5211 double star mounting
- Corrosion prevention heaters
- Limit Switches
- Declutchable Manual Overrides
- 150% holding power
- 75% Duty Cylce
- Torque Limiters

Optional Features Include:

- Electronic positioner for 0–10V or 4–20mA signals.
- Fail Safe Battery Backup

Pneumatic Actuators

IPEX offers compact pneumatic actuators to meet the demands of industrial facilities. The actuators can be ordered as Normally open (air to close, spring to open), Normally closed (air to open, spring to close) or Dual acting (air to open, air to close). Our actuators come standard with the following options:

- Polyamide outer case for superior corrosion resistance.
- Preloaded spring cartridges (NO/NC)
- Stainless Steel Pinions & Fasteners
- Namur Mounting
- Blowout Proof Protections
- ISO 5211 Output Drive
- Versatile Control Media (Air, Hydraulic oil or Water)

Optional Features Include

- Housing: GRPP, Aluminum, or Stainless Steel
- NEMA 4/4X & NEMA 7 & 9
- NEMA 4X & NEMA 7 Namur Solenoid valves.
- Declutchable Gearbox
- Positioners

Limit Switches

IPEX offers a full range of compact Mechanical or inductive proximity switches. Limit switches send an electrical signal to the building's control system to indicate if the valve is in the open or closed position. The standard features include:

- Customizable high visibility indicator
- CSA ULC approval
- NEMA 4/4X rating.
- Technopolymer body

Stem Extensions

IPEX fabricates and mounts stem extensions on our butterfly valves. The stem extensions allow an operator to open or close a valve which may may have not been easily accessible. Our stem extensions are available with a carbon steel or stainless steel shaft. The shaft will be contained within a PVC pipe for superior chemical and corrosion resistance.

• Available from 1 ft to 30 ft long

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Valve Selection

Significant Number

Significant Number	IPEX Part Number	Body Material	Body Style	Liner Material	Size	Disc Material	Control Style	Pressure Rating @ 730F	Code Position	FX 1	0 2	V 3	1 4	07 5	G 6	
FXOV107	353089				1-1/2″		Lever Handle									
FXOV108	353090				2″				Position	Code		De	script	ion		
FXOV109	052137				2-1/2"				_			Мос	lel			
FXOV110	353091	PVC	Wafer	EPDM	3″	PP		150 PSI	1	FX	Butte	erfly V	alve			
FXOV111	353092				4″							Conno	otion			
FXOV113	353093				6″				2	0		Lonne		a – M	lafer	
FXOV114	353094				8″	-				0	ANO	100 1	lang		raici	
FXOV207	353097				1-1/2″				3		В	ody M	ateric	ıl		
FXOV208	353098				2″					V	PVC					
FXOV209	052139		Wafer	r FPM	2-1/2"			e 150 PSI		Liner Material						
FXOV210	353099	PVC			3″	PP	Lever Handle		4	1 EPDM						
FXOV211	353100				4″					2	FPM					
FXOV213	353101				6″					Size	Imp	erial		DN	l	
FXOV214	353102				8″					07	1-1	/2″		40 n	าฑ	
FXOV109G	254102				2-1/2″		Gearbox	150 PSI		08		2″		50 m	nm	
FXOV110G	254103				3″					09	2-	1/2″		65 m	nm	
FXOV111G	254104				4″				5	10	-	3″		80 n	าทา	
FXOV113G	254106	PVC	Wafer	EPDM	6″	PP				11	4	4"		100 r	nm	
FXOV114G	254107				8″					13	(5″		150 r	nm	
FXOV115G	254108				10″					14	3	3"		200 r	nm	
FXOV116G	254109	-			12″			120 PSI		15	1	0" ว"		250 r	nm	
FXOV209G	254110				2-1/2"					10		2		3001		
FXOV210G	254111				3″						(Contro	l Style	e		
FXOV211G	254112				4″				6		Leve	r Han	dle			
FXOV213G	254114	PVC	Wafer	FPM	6″	PP	Gearbox	150 PSI		G	Gear	box				
FXOV214G	254115				8″											
FXOV215G	254116				10″											
FXOV216G	254117				12″			120 PSI								

Product Data Sheet

Dimensions



FX Butterly Valve - Lever Handle

Weight of FX with PP Disc

d	DN	ΦA min	Φ A max	B2	B3	С	C1	н	Φf	# holes	Z	EPDM Liner (Ibs)	FPM Liner (Ibs)
11/2″	40	3.90	4.29	2.36	5.63	6.89	3.54	5.20	0.75	4	1.30	2.05	2.09
2″	50	4.53	4.94	2.76	5.87	6.89	3.54	5.79	0.75	4	1.69	2.45	2.56
2 1/2″	65	5.04	5.67	3.15	6.14	6.89	3.54	6.50	0.75	4	1.81	2.80	2.98
3″	80	5.71	6.30	3.66	7.28	9.84	3.74	7.28	0.75	12	1.93	4.56	4.79
4″	100	6.50	7.48	4.21	7.83	9.84	3.74	8.31	0.75	8	2.20	5.56	5.90
5″	125	8.03	8.46	4.72	8.62	13.19	3.74	9.45	0.91	8	2.52	7.94	8.45
6″	150	9.06	9.53	5.28	9.13	13.19	3.74	10.55	0.91	8	2.76	9.91	10.60
8″	200	11.02	11.73	6.34	12.36	16.73	6.46	12.72	0.91	8	2.80	18.20	19.40

Unless otherwise stated all dimensions shown above are in inches

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FX Butterfly Valve – Free Stem											Weigh with F	nt of FX PP Disc				
d	DN	Φ A min	ФА max	B1	B2	J	ΦF		т	Q	Н	Φf	# holes	Z	EPDM Liner (Ibs)	FPM Liner (Ibs)
11/2	40	3.90	4.29	4.17	2.36	0.28	1.97	F05	0.47	0.43	5.20	0.75	4	1.30	1.60	1.65
2″	50	4.53	4.94	4.41	2.76	0.28	1.97	F05	0.47	0.43	5.79	0.75	4	1.69	2.01	2.11
2 1/2"	65	5.04	5.67	4.69	3.15	0.28 – 0.35	1.97 – 2.76	F05 – F07	0.47	0.43	6.50	0.75	4	1.81	2.36	2.54
3″	80	5.71	6.30	5.24	3.66	0.35	2.76	F07	0.63	0.55	7.28	0.75	12	1.93	3.46	3.70
4″	100	6.50	7.48	5.79	4.21	0.35	2.76	F07	0.63	0.55	8.31	0.75	8	2.20	4.47	4.81
5″	125	8.03	8.46	6.57	4.72	0.35	2.76	F07	0.75	0.67	9.45	0.91	8	2.52	6.41	6.91
6″	150	9.06	9.53	7.09	5.28	0.35	2.76	F07	0.75	0.67	10.55	0.91	8	2.76	8.37	9.06
8″	200	11.02	11.73	8.94	6.34	0.43	4.02	F10	0.94	0.87	12.72	0.91	8	2.80	14.98	16.17
10″	250		14.25	9.76	8.27	0.43-0.51-0.67	4.02-4.92-5.51	F10-F12-F14	1.14	1.06	15.94	1.00	12	4.49	39.26	40.45
12″	300		17.01	12.01	9.65	0.43-0.51-0.67	4.02-4.92-5.51	F10-F12-F14	1.14	1.06	18.70	1.00	12	4.49	49.71	50.90

Unless otherwise stated all dimensions shown above are in inches

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Flow Coefficients

The flow coefficient (C_v) represents the flow rate in gallons per minute (GPM) at 68°F for which there is a 1 psi pressure drop across the valve in the fully open position. These values are determined from an industry standard testing procedure which uses water as the flowing media (specific gravity of 1.0). To determine specific flow rate and pressure loss scenarios, one can use the following formula:

Where,

- f is the pressure drop (friction loss) in psi,
- sg is the specific gravity of the fluid,
- Q is the flow rate in GPM,
- C_V is the flow coefficient.

Flow Coefficient Correction Factor

 $f = sg \times \left(\frac{Q}{C_V}\right)^2$

Use this chart to determine the appropriate flow coefficient correction factor depending on the amount of disc travel. As the valve cycles from fully open (100% travel) to fully closed (0% travel), the corresponding C_v value will decrease in accordance with the adjacent graph.



Size (in)	C _v
1-1/2	70
2	90
2-1/2	119
3	249
4	413
5	690
6	1309
8	2135
10	3724
12	5712

Pressure Loss Chart



Components



#	Component	Material
1	Handle	PVC
2	Screw	304 Stainless Steel
3	Washer	304 Stainless Steel
4a	Plug Upper Part	PVC
4b	Plug Lower Part	PVC
5	Shaft	316 Stainless Steel
6	Shaft O-ring	EPDM or FPM
7	Shaft O-ring	EPDM or FPM
8	Seeger ring	304 Stainless Steel
9	Bush O-ring	EPDM o FPM
10	Bush	Nylon
11	Body	PVC
13	Anti-friction ring	PTFE
14	Disc	PPH
15	Primary Liner	EPDM, FPM
16	Washer	304 Stainless Steel
17	Srew	304 Stainless Steel
18	Protection Cap	PE
23	Tag Holder	NBR
24	Plug O-ring	PVC





#	Component	Material
1	Position Indicator	ABS
2	Handle	PVC
3	Plug Upper Part	PVC
3b	Plug Lower Part	PVC
4	Screw	304 Stainless Steel
5	Flange	SO4 Stainless Steel
7	Screw	304 Stainless Steel
8	Tag Holder	NBR
9	Plug O-Ring	PVC
10	Pad	GR-PP
11	Washer	304 Stainless Steel
12	Nut	304 Stainless Steel
13	Seeger Ring	304 Stainless Steel
14	Shaft	316 Stainless Steel
15	Bush O-ring	EPDM or FPM
16	Bush	Nylon
17	Shaft O-ring	EPDM or FPM
18	Shaft O-ring	EPDM or FPM
19	Body	PVC
20	Protection Cap	PE
21	Screw	304 Stainless Steel
22	Washer	304 Stainless Steel
23	Anti-friction Ring	PTFE
24	Dish O-ring	EPDM or FPM
25	Disc	PPH
26	Primary Liner	EPDM, FPM
28	Protection Cap	PE



#		Component	Material
	1	Position Indicator	ABS
	2	Handle	PVC
	3	Plug Upper Part	PVC
	30	Plug Lower Part	PVC
	5	Washor	304 Stainless Steel
	6	Flance	GR-PP
	7	Screw	304 Stainless Steel
	8	Tag Holder	NBR
	9	Plug O-Ring	PVC
	10	Pad	GR-PP
	11	Washer	304 Stainless Steel
	12	Nut	304 Stainless Steel
	13	Seeger Ring	304 Stainless Steel
	14	Shaft	316 Stainless Steel
	15	Bush O-ring	EPDM or FPM
	16	Bush	Nylon
	17	Shaft O-ring	EPDM or FPM
	18	Shaft O-ring	EPDM or FPM
	19	Body	PVC
	20	Protection Cap	PE
	21	Screw	304 Stainless Steel
	22	Washer	304 Stainless Steel
	23	Anti-friction Ring	PTFE
	24	Dish O-ring	EPDM or FPM
	25	Disc	PPH
	26	Primary Liner	EPDM, FPM
	28	Protection Cap	PE

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Size 10" - 12"

#	Component	Material
1	Body	PVC
2	Washer	304 Stainless Steel
3	Bushing	PP
4	Bushing O-ring	EPDM FPM
5	Bushing for O-ring) PP
6	Washer	PTFE
7	Primary Liner	EPDM FPM
8	Anti-friction Ring	PTFE
9	Disc O-ring	EPDM FPM
10	Disc	PP
11	Washer	304 Stainless Steel
12	Washer	304 Stainless Steel
13	Сар	PE
14	Screw	304 Stainless Steel
15	Washer	304 Stainless Steel
16	Shaft	316 Stainless Steel
17	Shaft O-ring	EPDM FPM
18	Retaining Ring	304 Stainless Steel
19	O-Ring	EPDM FPM

Installation Procedures

- 1. For the lever handle style, attach the handle to the valve body using the supplied bolt and washer. Affix the cap over the bolt.
- 2. For non-lugged style sizes 1-1/2" through 8", push the inserts into the body holes according to the position chart below.
- 3. Ensure that the length of the bolts is sufficient for the size of valve being installed. Due to the varying designs of plastic flanges, there is no recommended minimum length. However, a length that results in at least 5 exposed threads on each side should be sufficient.
- 4. Please refer to the appropriate application subsection:
 - a. For typical inline installation, ensure that the disc is in the partially closed position then carefully insert the valve into the piping system between the two flanges. Insert the bolts, washers, and nuts (if necessary), then hand tighten. Take care to properly line up the valve and flanges as any misalignment may cause leakage.
- 5. To avoid damage to the primary gasket, cycle the valve to the open position before tightening the bolts. For correct joining procedure, please refer to the section entitled, "Joining Methods Flanging" in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems". The bolts should be tightened in an even pattern to the nominal torque in the table below. These torque ratings are sufficient to maintain a watertight seal at the maximum rated operating pressure.

NOTE: If the process media is dirty or contains suspended particles, it is advisable to install the valve in an orientation in which the shaft is not vertical (see diagrams). Over time, particles may collect at the bottom of the valve posing a threat to the seal between the disc, liner, and shaft.

Si:	ze mm	*ANSI 150 Insert Pos.	L min. (inch)	Lb/ft
11/2	40	_	6	6.6
2	50	-	6	8.9
2 1/2	65	-	7	11.1
3	80	-	7	13.3
4	100	* POS 2	7	14.8
5	125	* POS 2	8.5	25.8
6	150	* POS 2	9.5	29.5
8	200	* POS 2	10.5	40.6
10	250	-	12.5	51.6
12	300	-	13.5	51.6
*				

* accessories

Product Data Sheet







Clean Fluid

Suspended Particles





Product Data Sheet

Testing and Operating

The purpose of system testing is to assess the quality of all joints and fittings to ensure that they will withstand the design working pressure, plus a safety margin, without loss of pressure or fluid. Typically, the system will be tested and assessed in sub-sections as this allows for improved isolation and remediation of potential problems. With this in mind, the testing of a specific installed valve is achieved while carrying out a test of the overall system.

An onsite pressure test procedure is outlined in the IPEX Industrial Technical Manual Series, "Volume I: Vinyl Process Piping Systems" under the section entitled, "Testing". The use of this procedure should be sufficient to assess the quality of a valve installation. In any test or operating condition, it is important to never exceed the pressure rating of the lowest rated appurtenance in the system.

Important points:

- Never test thermoplastic piping systems with compressed air or other gases including air-over-water boosters.
- When testing, do not exceed the rated maximum operating pressure of the valve.
- Avoid the rapid closure of valves to eliminate the possibility of water hammer which may cause damage to the pipeline or the valve.

Please contact IPEX customer service and technical support with regard to any concern not addressed in this data sheet or the technical manual.

Product Data Sheet

Sample Specification

1. GENERAL

1.1 DEFINITIONS

- A. EPDM: Ethylene Propylene Diene Monomer
- B. FPM: Fluoropolymer
- C. PP: Polypropylene
- D. PTFE: Polytetrafluoroethylene Plastic (Teflon®)
- E. PVC: Polyvinyl Chloride Plastic
- F. SS: Stainless Steel

2. PRODUCTS

2.1 BUTTERFLY VALVES

- A. The basis of design is the IPEX FX Butterfly Valve:
 - a. Design:
 - 1. All materials listed below shall conform to NSF Standard 61 for use with potable water.
 - 2. The liner shall completely isolate the valve body from the process flow.
 - 3. The liner shall function as a flange gasket on both sides of the valve.
 - 4. The disc, seats, and seals shall be the only wetted parts.
 - 5. PTFE seated o-ring seals shall prevent the SS shaft from becoming wetted.
 - 6. The valves shall be marked to indicate size, material designation, and manufacturers name or trade mark.
 - b. Body Material: Dark grey color PVC
 - c. Disc Material:
 - 1. PP Type 1 homopolymer per ASTM D4101.
 - or PVC, cell class 12454 per ASTM D1784.
 - d. Pressure Rating (psi / kPa): _____.
 - e. Connection Type: ANSI 150 Wafer Style flange.
 - f. Disc Liner & Stem Seals Material:
 - a. EPDM
 - b. or FPM
 - g. Shaft: 316 SS Standard ISO square dimension for direct mount actuation

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h. Accessories:

- 1. Lockable Lever Handle with transparent PVC plug and tag holder for valve identification.
- 2. Manual Gear box
- 3. 2" Square Nut Operator
- 4. Silicone Free valves shall:
 - a. Be cleaned and assembled in an ISO 14644-1 clean room.
 - b. Be double bagged within a dual skin silicone free package to prevent contamination during transportation.
 - c. Use a factory applied silicone free lubricant.
 - d. Have a factory applicable sticker indicating the valve is silicone free.
- i. Factory Mounted Options
 - 1. 90 degree Pneumatic Actuator
 - a. Shall be sized for 80 psi compressed air
 - b. Fluid type shall be:
 - 1. Air
 - or Water
 - or Nitrogen
 - c. Configuration
 - 1. Dual acting (fluid to open, fluid to close)
 - or Normally Open (spring to open, fluid to close)
 - or Normally Closed (fluid to open , spring to close)
 - d. Shall be dual piston rack and pinion design with linear torque output.
 - e. Anti-blowout bidirectional pinion retention
 - f. Pre-loaded spring cartiridges for ease of servicing
 - g. ISO 5211 mounting
 - h. High Visibility Beacon that indicates "OPEN" or "CLOSED"
 - i. Body Material:
 - 1. Technopolymer
 - or GFPP
 - or Anodized Aluminum
 - or 316 Stainless Steel
 - j. All external fasteners shall be stainless steel.
 - k. The pneumatic actuator shall be factory installed and tested by the valve manufacturer.

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- 2. Namur solenoid valve
 - 1. Enclosure shall be:
 - a. Standard: NEMA 4/4X (IP 67 watertight)
 - b. Explosion Proof: NEMA 7/9
 - 2. 1/4" NPT connection
 - 3. CSA, UL & ATEX approval
 - 4. Voltage:
 - a. 12V DC
 - or 24V DC
 - or 120V DC
 - or OR 220V DC
 - 5. Operating temperature range -4°F to 158°F
 - 6. Working pressure: 0 120 PSI
 - 7. The solenoid control valve shall be supplied by the actuator manufacturer
- 3. 90 degree Electric Actuator
 - a. Voltage & Duty Rating:
 - 1. 12V DC Duty: 50%
 - or 24V DC Duty: 75%
 - or 24V AC Duty: 75%
 - or 100V 240V AC Duty: 75%
 - b. Internal torque limiters, thermal protection, auxiliary limit switches, and heater for corrosion protection.
 - c. Enclosure:
 - 1. NEMA 4X technopolymer enclosure (indoor use only)
 - 2. NEMA 4X Aluminum enclosure (Indoor or Outdoor)
 - d. Manual override
 - e. Visual position indicator as standard to indicate the "OPEN" or "CLOSED" position.
 - f. ISO 5211 mounting
 - g. Options:
 - 1. Linear potentiometer (except VB015)
 - 2. Failsafe battery backup
 - h. The electric actuator shall be factory installed and tested by the valve manufacturer.

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4. Limit Switch

- a. Shall come with the following options:
- b. Voltage:
 - 1. Up to 12V to 250V DC or AC
 - 2. Material:
 - a. Body, Box, Shaft, switches: Technopolymer
 - b. Fastners: SS
 - c. Seals: BUNA-N
 - d. High Visibility Beacon that indicates "OPEN" or "CLOSED"
 - e. NEMA 4/4X rating
 - f. CSA & UL listing required.
 - g. Supplied and installed by the valve manufacturer
- 5. Stem Extension
 - a. Factory fabricated and installed by the valve manufacturer.
 - b. Stem Material:
 - 1. Carbon Steel
 - 2. Stainless Steel
 - c. Outer Casing
 - 1. PVC
 - 2. Other: ____
 - d. Length shall be __ (rounded to nearest inch) OR as specified in the schedule.
 - 1. Minimum length 12",
 - Maximum length 360"
- ii. Acceptable Manufacturers
 - a. IPEX
 - b. Or approved alternate
 - 1. Requests for alternate material must be approved by the consulting engineer prior to the bid closing date.

About IPEX

About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the world's largest and most comprehensive product lines. All IPEX 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 established a reputation for product innovation, quality, enduser focus and performance.

Markets served by IPEX group products are:

- Electrical systems
- · Telecommunications and utility piping systems
- 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
- PVC, CPVC, PP, PVDF, PE, ABS, and PEX pipe and fittings

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A policy of ongoing product improvement is maintained. This may result in modifications of features and/or specifications without notice.

