INDUSTRY PERSPECTIVE:

Industrial Valve Manufacturing

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EXECUTIVE SUMMARY

The industrial valve manufacturing industry provides flow control devices for diverse applications in manufacturing processes and water utilities infrastructure. Additionally, it also includes specialized valves for the aerospace, oil, and energy markets. Valves are critical components to many processes in these industries, serving to start and stop flow, increase or reduce flow, control the direction of flow, regulate flow pressure, and relieve a system of excess pressure.

The U.S. industrial valve manufacturing industry is widely fragmented and composed of large national or global corporations competing with hundreds of smaller players operating at the local level. In the coming years, market share concentration is expected to rise, as major operators continue to outperform the industry by developing and marketing new valve varieties. Consolidation is enabling companies to devote more resources to research and development, enter new markets, and diversify their product portfolio to mitigate losses from future economic downturns.

KEY OBSERVATIONS

- The primary end-markets for industrial valves are: Oil & Energy, Heavy Manufacturing, Waterworks & Construction, and General Manufacturing. Oil and Energy is the largest end-market, accounting for about 44% of the industry's domestic U.S. revenue.
- The domestic U.S. market for industrial valves is in the mature stage of its life cycle, experiencing an average decline in revenue of 1.8% from 2014 to 2019. The industry is projected to see a modest CAGR of 0.7% to reach $24.8bn in revenue by 2024.
- U.S. valve manufacturers are most densely concentrated in the Southwest and Great Lakes area in order to better serve oil & energy and manufacturing end-markets and the Mexican and Canadian markets.
- Industrial valve manufacturers compete on the basis of product performance, price, consistency of quality, reliability of delivery, and additional services offered. Import pressure is significant, and U.S. manufacturers attempt to differentiate based on quality, as they cannot compete with Asian suppliers in terms of price.
- Merger and acquisition strategies vary widely, as some companies are attempting to gain market share in their specific niches and others are trying to diversify their product line to prepare for potential downturns.
- Some diversified manufacturers have begun to divest certain valve and flow control divisions, further driving M&A activity as they exit non-core segments.

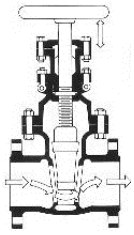
INTRODUCTION TO INDUSTRIAL VALVES

Valves are mechanical devices that control the flow and pressure of liquids, gases, and slurries within a system. Industrial valves are used in a wide variety of industries, including Water and Wastewater Management, Oil and Gas, Power, Chemicals, and Food Processing. Valves can serve several purposes within a system.

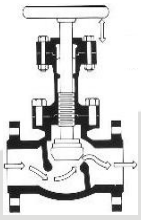
- Starting and stopping flow
- Increasing or reducing flow
- Controlling the direction of flow
- Regulating flow pressure
- Relieving a system of excess pressure.

Although industrial valves are often custom designed to suit the needs of the user, they can be classified by six different types that are most commonly used:

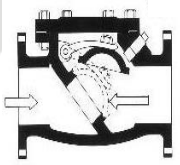
- **Gate valves** are designed primarily to start and stop flow. They are used when a straight-line flow of the system and minimum flow restriction are desired. In use, these valves are generally either fully open or fully closed. When closed, they generally provide a tight seal. The valve shuts by turning the hand wheel, which moves a disk down from the bonnet into the body of the valve, where it restricts flow from occurring. It opens by moving the disk up into the bonnet. Gate valves can be applied to a wide range of liquids and some gases.



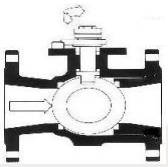
- **Globe valves** are linear motion valves that mainly serve to regulate, start, and stop flow. Standard globe valves can be used for isolation or throttling of flows. Although these valves experience a larger pressure drop than valves that the flow moves through in a straight line (e.g., gate, ball, and plug valves), they may be used in any application where pressure drop is not a crucial factor. Since all of the pressure exerted on the closing disc of the valve is transferred to the valve stem, the practical sizes for this valve type are somewhat limited, as large globe valves would take large amounts of force to be opened or closed under pressure.



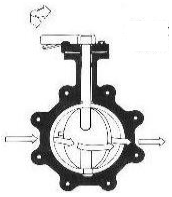
- **Check valves** open automatically when the flow occurs in the desired direction and close automatically when flow occurs in the direction opposite to the desired flow. It has these characteristics, as the pressure of the fluid passing through either pushes the valve disc open (when in the desired direction) or forces the disc to shut off the valve (when in the opposite direction). The exact functionality of these valves depends on their subtype. The most common subtypes of check valves are swing, lift, and stop valves.



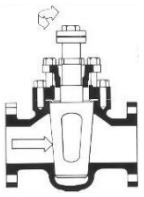
- **Ball valves** are rotational motion valves that use a ball-shaped disc with a hole in the middle to start or stop flow. The disc is rotated when opened/closed, as opposed to moved in a linear motion up/down. Furthermore, ball valves are quarter turn valves, which means that only a 90 degree turn of the handle is needed to fully close/open the valve. When a ball valve is opened, the ball rotates to a point where the hole through the ball is aligned with the valve body, so that flow can occur. To close the valve, the ball is rotated back so that the hole in the disc is perpendicular to the flow openings and restricts flow from occurring. Ball valves generally have good sealing, but poor throttling properties. Their design allows for smaller dimensions than other valve types.



- **Butterfly valves** are quarter turn rotational motion valves used to start, throttle, and stop flow. This type of valve requires little force to open. Butterfly valves have several advantages, especially in large applications, as they are relatively light, small, and inexpensive. Additionally, maintenance costs are relatively low, as there are fewer moving parts than in most other valve types. Butterfly valves are best suited for handling large flows of fluids or gases at relatively low pressure.



- **Plug valves** are quarter turn rotational motion valves that use a cylindrical or tapered disc to stop or start flow. In its open position, the plug's passage is aligned with the in and outlet ports of the valve body. When shut, the solid part of the plug blocks the ports and restricts flow. Plug valves are fairly similar to ball valves in terms of operation and applications but require large force to open/close due to high friction.



MARKET SEGMENTATION FOR U.S. INDUSTRIAL VALVES

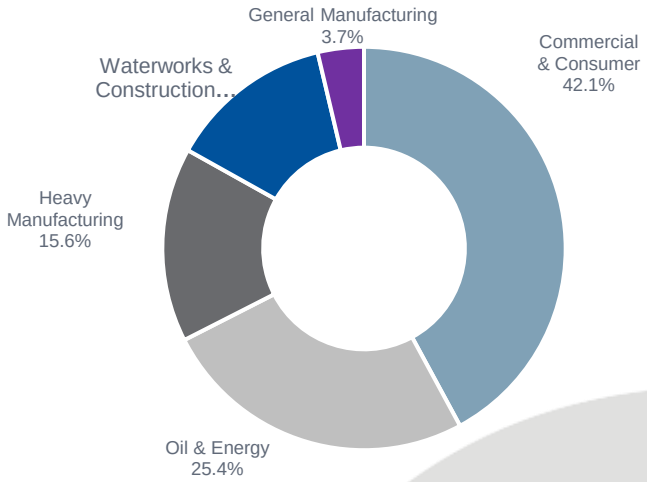
The U.S. industrial valve manufacturing industry is expected to generate $23.9bn in 2019 revenue. Larger valve manufacturers typically market their products directly to end users through their own internal sales offices. Smaller producers might sell their products to intermediate distributors, who then resell to end users. The largest portion of U.S. industrial and fluid power valve sales is generated through exports. The remaining sales can be attributed to four domestic industries: Oil & Energy, Heavy Manufacturing, Waterworks & Construction, and General Manufacturing.

EXPORTS

U.S. industrial valve manufacturers export approximately $10.1bn worth of products on an annual basis. The share of export revenue has grown steadily over the past five years despite appreciation of the U.S. dollar. This rise in demand was mainly driven by Mexican, East Asian, and oil-producing markets.

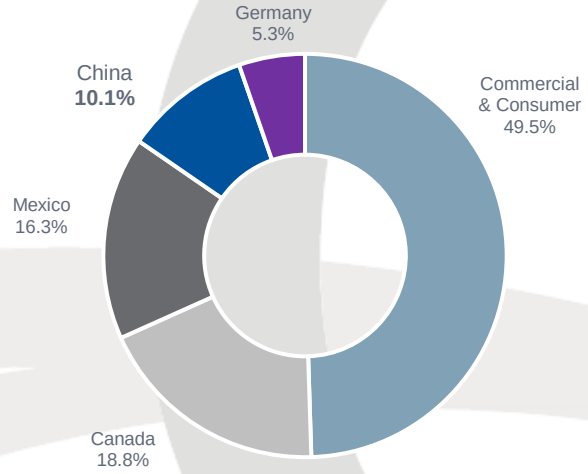
Mexico mainly demands U.S.- made valves for applications in the energy sector, as do the oil-producing markets in the Middle East and elsewhere. China uses industrial valves for applications in the general manufacturing sector, whereas South Korea primarily imports valves for use in more advanced applications in the energy sector. Canada is the largest importer of U.S. manufactured industrial valves.

MARKET SEGMENTATION (2019)



Source: IBISWorld

EXPORT SEGMENTATION (2019)



Source: IBISWorld

Industrial valve exports are expected to continue rising as a share of total revenue over the next five years as a result of a weakening dollar and continued growth in most emerging markets. Trade tensions, however, could hurt valve exports to China in the short run.

OIL AND ENERGY

Petroleum industry valves are typically specialized, high pressure, steel or ceramic composite products used for drilling, producing, and gathering crude oil and gas. This segment also uses valves to connect oil and gas transmission and distribution lines. An estimated 79.2% of sales in this segment can be attributed to crude oil production and refining companies and about 20.8% to pipeline transmission companies, according to the national trade organization Valve Manufacturers Association (VMA).

Despite a modest recovery of crude oil prices, demand from the upstream market is expected to remain low during the next 2-3 years. However, demand from these markets is expected to grow gradually in the 2022-2024 period, which could help drive revenue growth and improve profit margins. Petrochemical activity is projected to grow modestly over the course of the next five years, as the sector faces increased pressure from import competition.

HEAVY MANUFACTURING

Industrial valves are critical components of many heavy manufacturing processes in mining, refining of primary metals, chemical production, and shipbuilding.

These sub-segments have experienced mixed performance over the past five years. Demand from heavy manufacturing industries has somewhat stagnated, due to a fall in commodity prices and rising import penetration over the past five years. Overall, the heavy manufacturing share of the industry has increased since 2014, due to a sharp decline in demand from the Oil & Energy segment.

WATERWORKS AND CONSTRUCTION

The Waterworks and Construction industries use valves to control the flow of water through municipal and private infrastructure. The main purposes for the use of valves in these industries is to supply stable flows of clean water, discharge sewage, and wastewater.

Activity in the water and sewage systems sector is expected to increase over the next five years. Rising prices in this market combined with growth in water consumption and rising population are expected to stimulate demand for industrial valves. As U.S. waterway systems age, demand for valves should increase as local and state municipalities upgrade or expand existing water systems. According to the American Society of Civil Engineers' 2017 Report Card for America's Infrastructure, the U.S. waterway and sewage systems will require approximately $275bn in investment over the next 25 years to counteract deterioration of infrastructure conditions.

GENERAL MANUFACTURING

Valves play a critical role in many manufacturing processes, including pulp and paper production, automotive manufacturing, and food and beverage production.

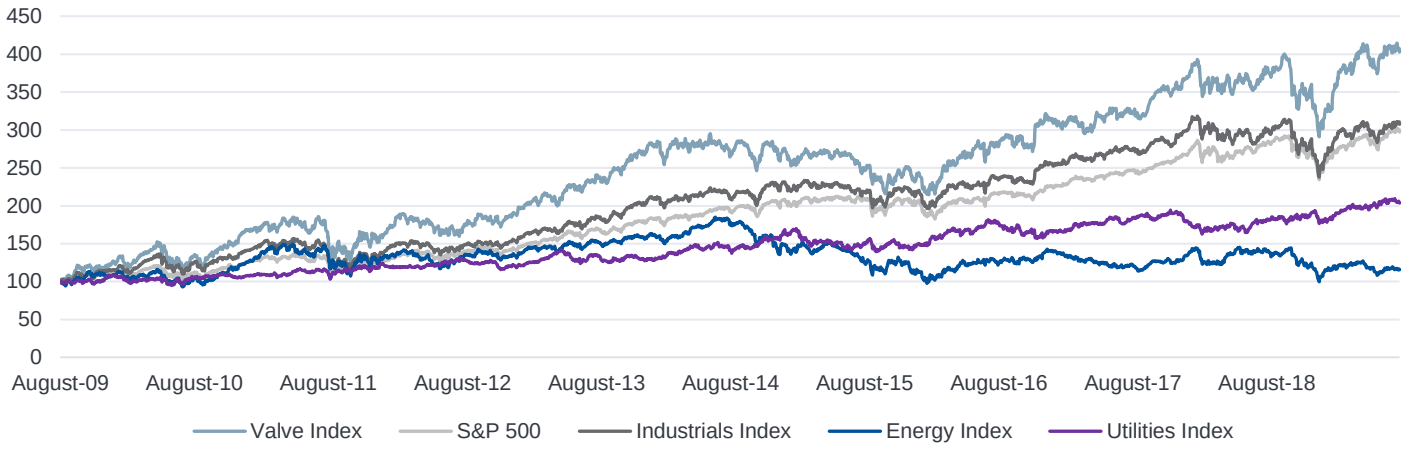
Demand for valves from nondurable goods and other non-industrial products manufacturers has grown steadily over the past five years, as consumer spending increased.

U.S. INDUSTRY ANALYSIS

HISTORICAL CONDITIONS

The domestic U.S. market for industrial valves is in the mature stage of its life cycle. The industry is expected to underperform the economy as a whole during the next five years. In 2015 and 2016, low commodity prices led to losses and placed downward pressure on industry margins. Since then, rising import pressure and increased internal competition have been detrimental to the industry's growth. The outlook for the next five years is an annual growth rate of 0.7%, which falls short of projected 2.2% annual GDP growth. Increased M&A activity is expected in this period, as companies attempt to offset slow organic growth, cut costs using economies of scale, and exit low-margin segments.

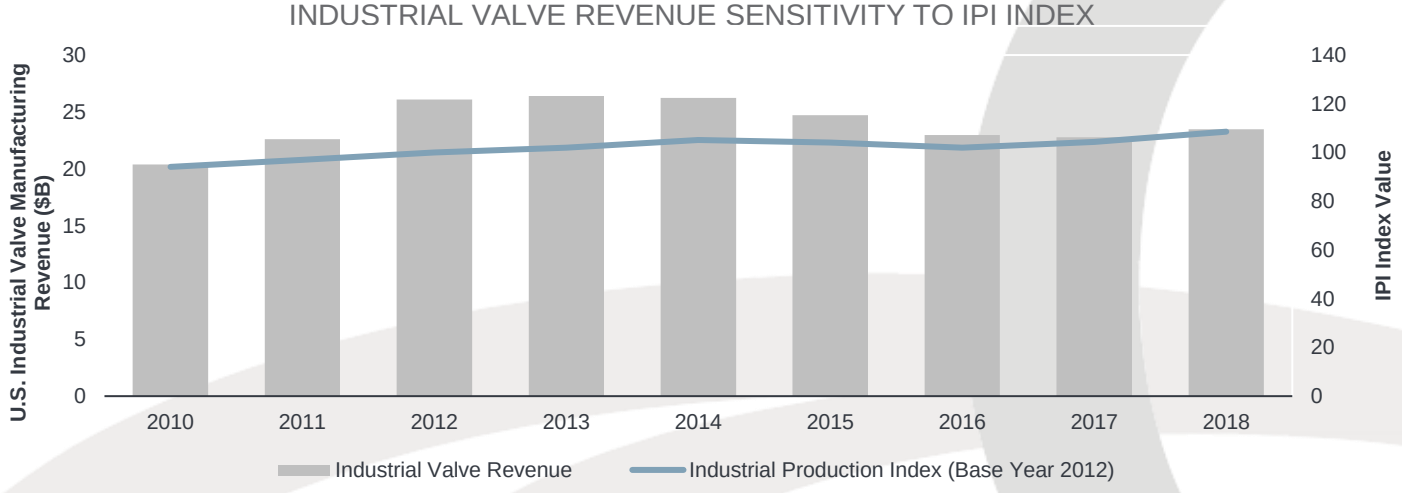
INDUSTRIAL VALVE INDEX COMPARISON



Source: S&P Capital IQ
*Proprietary index built from public U.S. industrial valve manufacturing companies.

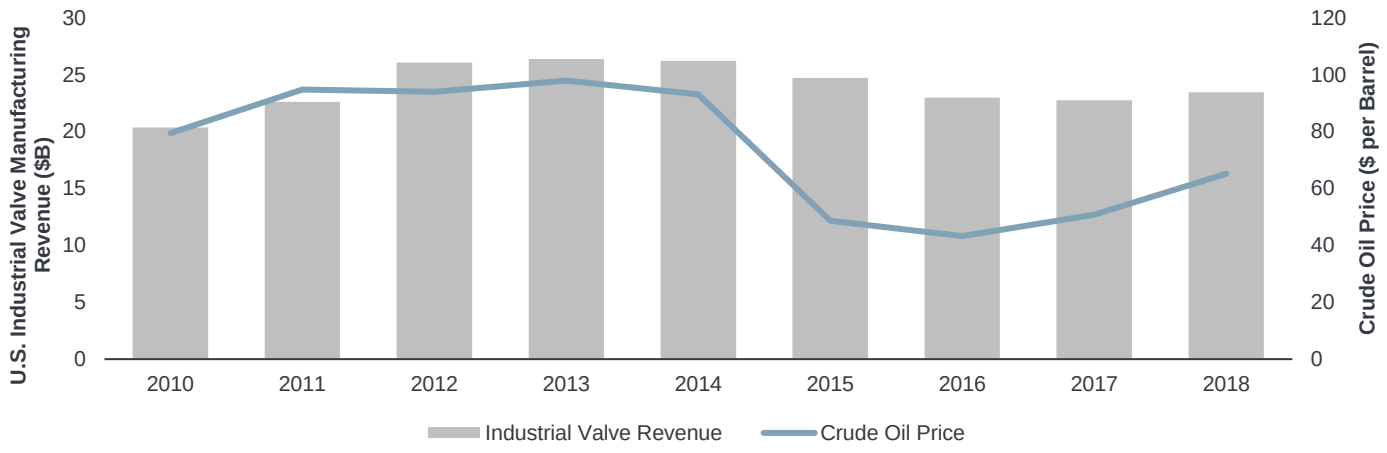
Revenue generated by the industrial valve industry has historically been correlated to the performance of the industrial production index (IRI) and crude oil prices, with correlation coefficients of 0.46 and 0.38, respectively, in the 2010-2018 period. This correlation exists because the primary end markets for industrial valves are the oil and energy and manufacturing industries.

INDUSTRIAL VALVE REVENUE SENSITIVITY TO IPI INDEX



Source: IBISWorld, U.S. Energy Information Administration (EIA).

INDUSTRIAL VALVE REVENUE SENSITIVITY TO CRUDE OIL PRICES



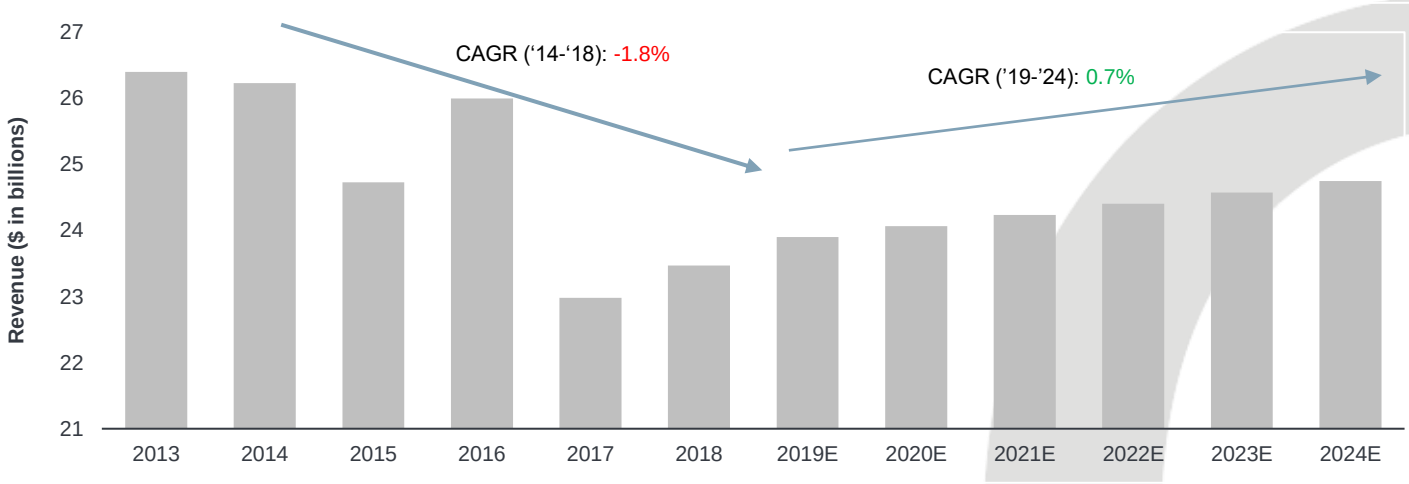
Source: IBISWorld, U.S. Energy Information Administration (EIA).

As can be seen in the graphs above, industrial valve revenue dipped at the same time as the IPI and crude oil prices dropped in the 2015-2017 period.

PROJECTED CONDITIONS

In the next five years, market conditions are expected to improve gradually for industrial valve manufacturers. However, growth is likely to be constrained by the volatile price of oil, which limits demand from the oil and energy end market. On the other hand, infrastructure and consumer goods manufacturing are expected to generate more demand over the course of the next few years.

U.S. INDUSTRIAL VALVE MANUFACTURING MARKET SIZE



Source: IBISWorld.

Industrial valve manufacturers are projected to invest heavily in research and development to enable them to produce valves of superior quality. This will allow them to compete more effectively with the low-priced import market and better cater to the needs of their industrial end markets. Furthermore, a generally positive economic outlook and continued technological improvement are likely to offset the lack of demand from the oil and energy market and result in revenue growth over the next five years. Overall, the industrial valve manufacturing industry is expected to grow at an annualized rate of 0.7% to $24.8bn over the 2020-2024 period.

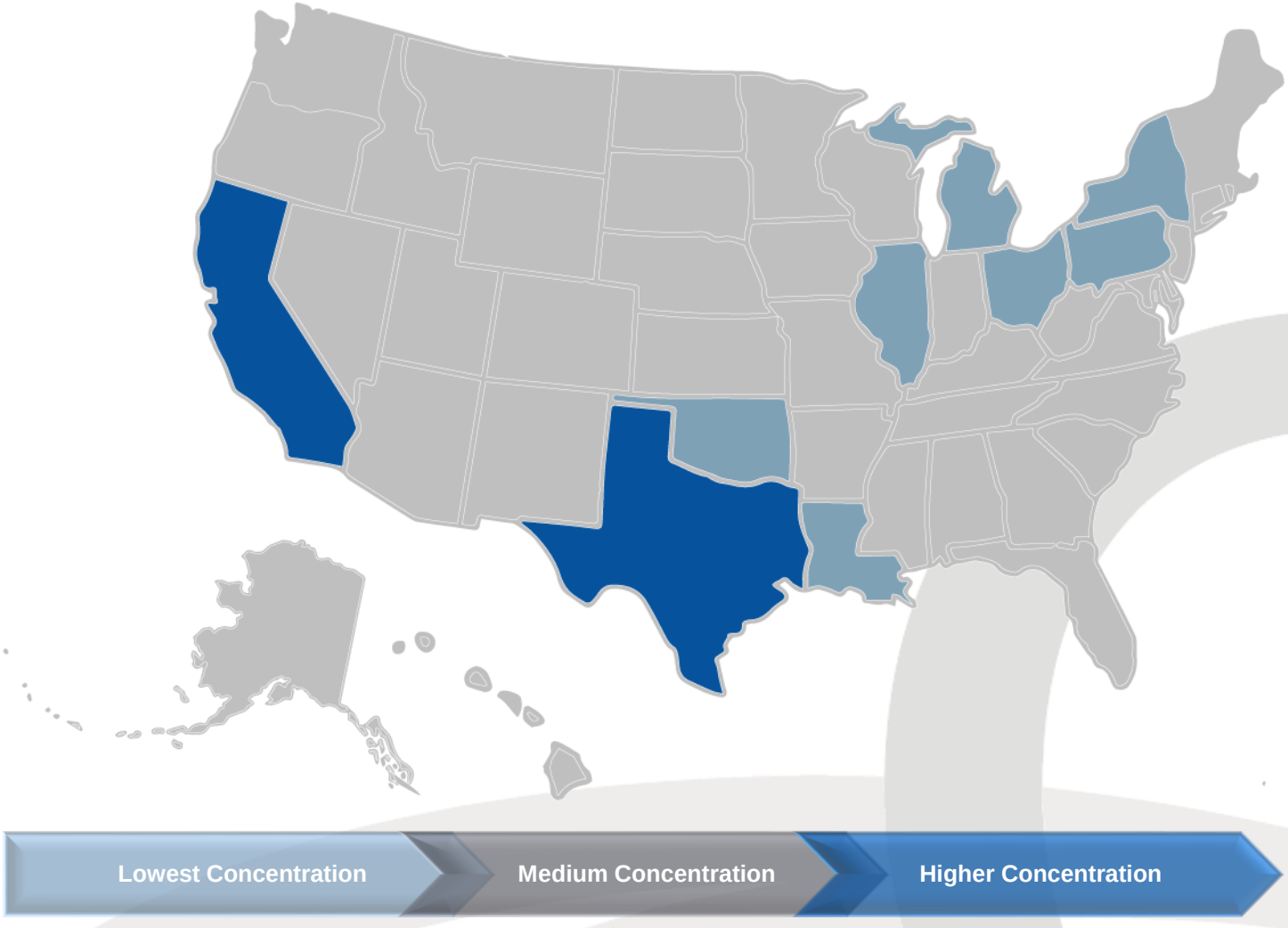
GEOGRAPHY

The Southwest and Great Lakes regions exhibit the highest concentrations of industrial valve manufacturers, based on data from the U.S. Bureau of Labor Statistics. Manufacturing activity tends to locate near sources of process inputs, geographic access to trade channels, and sources of demand. In the industrial valve manufacturing industry, geographic concentration seems to mirror the presence of end markets.

The Southwest is home to 23.1% of industry establishments. The region provides strategic access to the oil and energy market, which accounted for an estimated 44% of the industry's domestic revenue in 2019. Furthermore, the region provides easy access to waterways and the Mexican market, which accounts for about 16% of the industry's total exports.

The Great Lakes region is host to 16.8% of industry establishments. It has plentiful access to demand from the general and heavy manufacturing markets, as the region has a variety of manufacturing concentrations. It also serves the Canadian market which, at 19%, is the largest export market for U.S. industrial valves.

CONCENTRATION OF INDUSTRIAL VALVE MANUFACTURERS BY STATE



Source: IBISWorld.

COMPETITIVE LANDSCAPE

The industrial valve manufacturing industry is highly fragmented with about 700 businesses located in the U.S. The four largest players in the industrial valve space hold less than an estimated 20% of total market share by revenue.

Three of the four top players in the U.S. industry do not exclusively focus on industrial flow control manufacturing. Most of the small to medium sized industrial valve manufacturers, however, do focus entirely on valve production.

Parker-Hannifin is a motion and control technologies manufacturer for applications in a variety of industries, with a concentration in aerospace. In fiscal 2019, Parker's flow control division generated about 32% of its total sales.

Emerson Electric offers automation solutions, climate technology, and commercial and residential solutions. Emerson is a diversified manufacturer but sold off some of its non-core businesses in 2015 due to worsening operating conditions. Emerson operates in the industrial valve manufacturing industry through its automation solutions division, which generated about 56% of Emerson's total revenue in fiscal 2018. In 2016, Emerson acquired Pentair PLC's valves and control segment for $3.2bn, making Emerson the leading manufacturer of valves and related flow control products in North America.

Cameron International focuses mainly on manufacturing valves for the oil and gas extraction, refining, and distribution markets. In 2016, the company was acquired by Schlumberger, a leading oilfield services company, for $14.8bn.

Flowserve Corporation operates through three divisions: engineered products, industrial products, and flow control. The company's flow control division, which manufactures a variety of general and highly customized valves for the oil and gas, chemical, power, and water management sectors, accounted for approximately 32% of the company's fiscal 2018 revenue.

Industrial valve manufacturers compete on the basis of several factors:

- **Product Development**: The industrial valve manufacturing industry is characterized by high levels of technological innovation, as industry participants increasingly focus on developing specialized industrial valves with the highest precision, quality, and durability to attract new customers.
- **Price**: Price plays an important role in competition in the less complex valves markets. Product performance remains an important differentiating factor for valves with specialized applications.
- **Reliability**: Industrial valves are often indispensable components to the processes in which they are utilized. As such, customers value quick and reliable delivery times and consistent product quality, as late deliveries and defective valves can result in significant downtime costs.
- **Additional Services Offered**: Offering additional services, such as design advice, is another way valve supplier differentiate themselves, as they can help their customers save money on the cost of running their production processes.

M&A LANDSCAPE

Today's merger & acquisition activity in the industrial valve manufacturing space can best be categorized in three types of transactions:

1. Consolidation of smaller players to gain market share and add new technologies to existing product lines.
2. Divestiture by diversified manufacturers of their relatively low-margin valve manufacturing segments.
3. Divestiture by larger valve manufacturers of non-core businesses to specialize in niche valves.

NOTABLE TRANSACTIONS:

- In 2019, **The Weir Group**, an engineered solution provider, divested its flow control division.
- In 2018**, Emerson Electric Co.** acquired Aventics GmbH, to expand its presence in the growing fluid automation market.
- In 2017, **Flowserve Corporation** divested its forged valves manufacturing business.

APPENDIX

SELECT M&A TRANSACTIONS

DATE	ACQUIRER	TARGET	TARGET DESCRIPTION
Dec-19	Kibbutz Mishmar Haemek	Bermad CS Ltd.	Manufacturer of hydraulic control valves for fire protection in power, petrochemical, oil and gas, and other high-risk arenas.
Sep-19	NIBCO INC.	Milwaukee Valve Company, Inc.	Manufactures and supplies manual and actuated valves. The company serves chemical processing, commercial construction, fire protection, food and beverage, and several other markets.
Oct-19	Gold Pacific Co., Ltd.	Jokwang ILI Co., Ltd	Manufactures and markets automatic valve products. The company also offers precision control systems for petrochemicals, nuclear power generation, and semiconductor equipment's control systems.
Nov-19	JB Industries, Inc.	C&D Valve, LLC	Manufactures valves, locking refrigerant caps, fittings and tools.
Nov-19	Hunt Valve Company, Inc.	Pima Valve, LLC	Manufactures industrial valves for marine, oil & gas, industrial, and commercial markets.
Oct-19	ZETKAMA Sp. z o.o.	Fabryka Armatur Glucholazy S.A.	Manufactures valves of various pressure resistance used in installations operating in neutral, aggressive, and special environments.
Aug-19	IMI plc	PBM, Inc.	Designs and manufactures valves for applications in industrial, sanitary, instrument, marine and seawater, and energy sectors.
Sep-19	Yuhuan Yongsheng Enterprise Management Consulting Center	Yorhe Fluid Intelligent Control Co., Ltd	Manufactures ball valves for gas and water, filter and check valves, boiler valves, angle valves, thermostatic mixing valves, British valves, and safety valves.
Sep-19	DexKo Global Inc.	Safim SPA	Manufactures hydraulic power brake valves, master priority valves, master cylinders, trailer brake valves, park brake levers, brake cylinders, trailer components, oleo dynamic valves, and accessories.
Sep-19	KCM Capital Partners	Industrial Valve Sales & Service, Inc.	Engages in repairing and servicing pressure safety valves. It sells new control valves and actuators, as well as offers remanufactured valves.
Sep-19	ARI-Armaturen Albert Richter GmbH & Co. KG	Högfors Oy	Manufactures valves and strainers for energy and process industry. It also offers comprehensive support services including project design, implementation, and material recycling.
Aug-19	Airtech Vacuum Inc.	Champion Valves Inc	Manufactures check valves.
Jul-19	Movement Industries Corporation	HiAlloy Valve LLC	Manufactures and distributes valves for the oil and gas industry.
Jul-19	Undisclosed	Sern Ball Valves	Manufactures flow control ball valves for oil and gas sector. The company's products include trunnion mounted ball valves, cryogenic ball valves, subsea ball valves, and high tempered ball valves.

DATE	ACQUIRER	TARGET	TARGET DESCRIPTION
Jun-19	Shanghai Chuangli Group Co., Ltd	Zhejiang Zhongmei Machinery Technology Co	Produces coal mine electromechanical products, such as emulsion pump station, spray pump station, and bracket valves.
Jul-19	Undisclosed	DWK Valves (Tianjin) Co., Limited	Manufactures valves and fittings. Products include gate valves, ball valves, and exhaust valves.
Jul-19	Copaflo Fluid Control Proprietary Limited	Dynamic Fluid Control (Pty) Ltd.	Manufacturer of valves for water, wastewater, and mineral processing industries.
Jun-19	Undisclosed	Hyundai Heavy Industries Turbo Machine Company	Manufacturer of industrial taps, valves, pumps, and compressors.
Feb-19	First Reserve Corporation	Flow Control Division of The Weir Group	Manufactures valves, pumps, and controls for the global power generation, downstream oil and gas, and industrial sectors.
Feb-19	AUCTUS Capital Partners AG	Oleodinamica Marchesini S.r.l.	Manufacturer of rotating joints and valves. The Company also provides technical support services, such as design, assembly, and construction.
Dec-18	Emerson Electric Co	AE Valves SPRL	Manufactures a range of industrial valves for chemical, petrochemical, polymers, oil, coal gas, cryogenic, and heavy industries.
Oct-18	AURELIUS Equity Opportunities SE & Co. KGaA	VAG Holding GmbH	Manufactures valves used for water distribution and treatment, wastewater, dams/hydropower, power plant, industrial, pressure management, and gas applications.
Sep-18	Schenck Process Holding GmbH	Process Components Ltd.	Manufacturer of valves and discharge aids, as well as components and spare parts for the powder and liquid processing and bulk handling industries.
Aug-18	Undisclosed U.S. based private equity fund	AWC Frac Valves Inc.	Manufactures high pressure valves used in hydraulic fracturing for unconventional gas shale.
Aug-18	ONCAP	Precision Valve Corporation	Manufacturer of aerosol valves, actuators, pumps, caps, and closures and related dispensing solutions.
May-18	Emerson Automation Solutions	Aventics GmbH	Manufactures pneumatic components and valves. The company serves industrial automation, food and beverage, railway technology, life sciences, truck, and energy industries.
Apr-18	KITZ Corporation	Cephas Pipelines Corp.	Manufacturer of butterfly valves and fittings for power plant, shipbuilding, desalination, and oil and gas markets.
Apr-18	Metso Corporation	Valve Automation Division of Rotex Manufacturers and Engineers Private Limited	Manufacturers valve automation components.
Apr-18	Texas Hydraulics, Inc.	The Oilgear Company	Manufacturer of pumps and valves, such as screw-in cartridge, motion compensation, subsea, prefill and exhaust, shot, and high-pressure valves. It serves the global oil and gas industry.
Jan-18	Alpha Precision Group, Inc.	Mercury Manufacturing Company	Manufactures custom pressure relief valves, assembly solutions, and precision machined components.

SOURCE LISTINGS

Census
4600 Silver Hill Rd.
Washington, DC 20233
+1 301 763 8282
www.census.gov

Department of Labor
200 Constitution Ave., NW
Washington, DC 20210
+1 866 487 2365
www.dol.gov

EPA
1200 Pennsylvania Ave, N.W.
Washington, DC 20460
+1 202 564 4700
www.epa.gov

Federal Reserve
1 Federal Reserve Plaza
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+1 314 444 8444
www.stlouisfed.org

IBISWorld
40 Wall St.,15th Floor
New York, NY 10005
+1 917 267 0283
www.ibisworld.com

S&P Capital IQ
810 7th Ave.
New York, NY 10019
+1 212 812 4600
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Wermac.org
Info@wermac.org
www.wermac.org

World Bank
1818 H St., NW
Washington, DC 20433
+1 202 473 1000
www.worldbank.org

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EXECUTIVE TEAM

Bill Doepke[1]
Principal, Investment Banking
847-922-5458
william.doepke@originmerchant.com

Bob Wujtowicz[1]
Principal, Investment Banking
312-698=6904
robert.wujitowicz@originmerchant.com

Bruce Durkee[1]
Principal, Investment Banking
404-698-3754
bruce.durkee@originmerchant.com

Nick Newlin[1]
Principal, Investment Banking
312-698-6918
nick.newlin@originmerchant.com

Scott Simms[1]
Director
312-392-2099
scott.sims@originmerchant.com

1 Registered Representative
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