FOYO

FOYO VALVE

Professional Ceramic Valve Manufacturer for High Corrosive and Abrasive Applications

2018.XIAMEN

FOYO VALVE

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Company Profile

Company Profile of FOYO

FOYO has professional R&D technical team, who has rich experience of design, production and application of ceramic valves. FOYO products range includes fully lined ceramic ball valve, V port ceramic control ball valve,
ceramic butterfly valve, ceramic segment ball valve, ceramic double disc gate valve, ceramic knife gate valve, ceramic wedge gate valve, ceramic globe valve and ceramic check valve, ceramic pipe fittings and so on. Meanwhile
FOYO can offer professional anti-abrasive, anti-corrosive and high temperature fluid control solutions.
FOYO ceramic valves and pipe fittings have been exported to North America, South America, Europe, Middle East, Southeast Asia, etc. Product application field covers coal-fired power plant, steel mill, metallurgy, mining, coal chemical industry, polysilicon, papler&pulp, lithium battery, petrochemical and so on.
Quality is the life of enterprise! FOYO always put quality at the first place and adhere to technical innovation.

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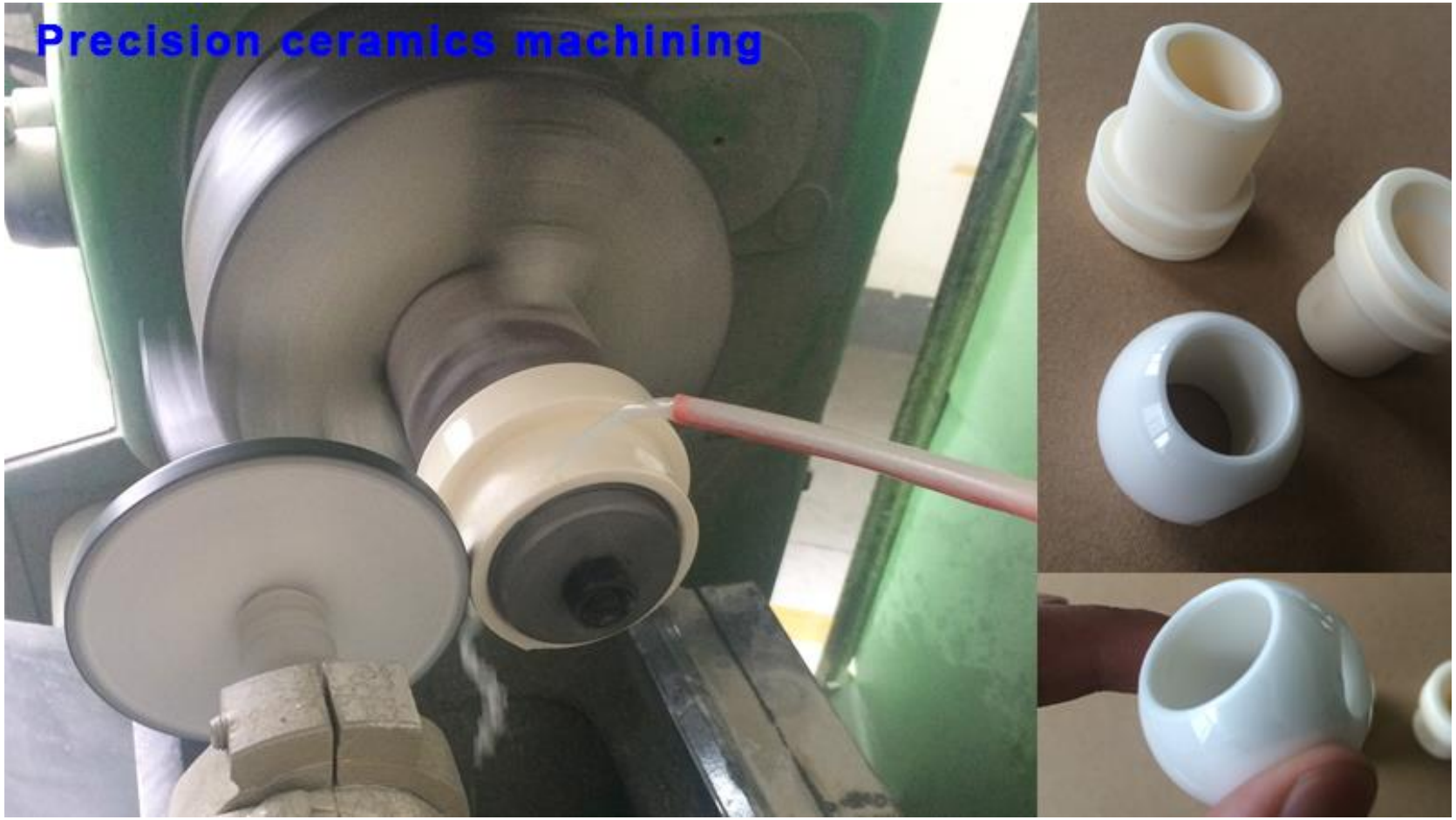
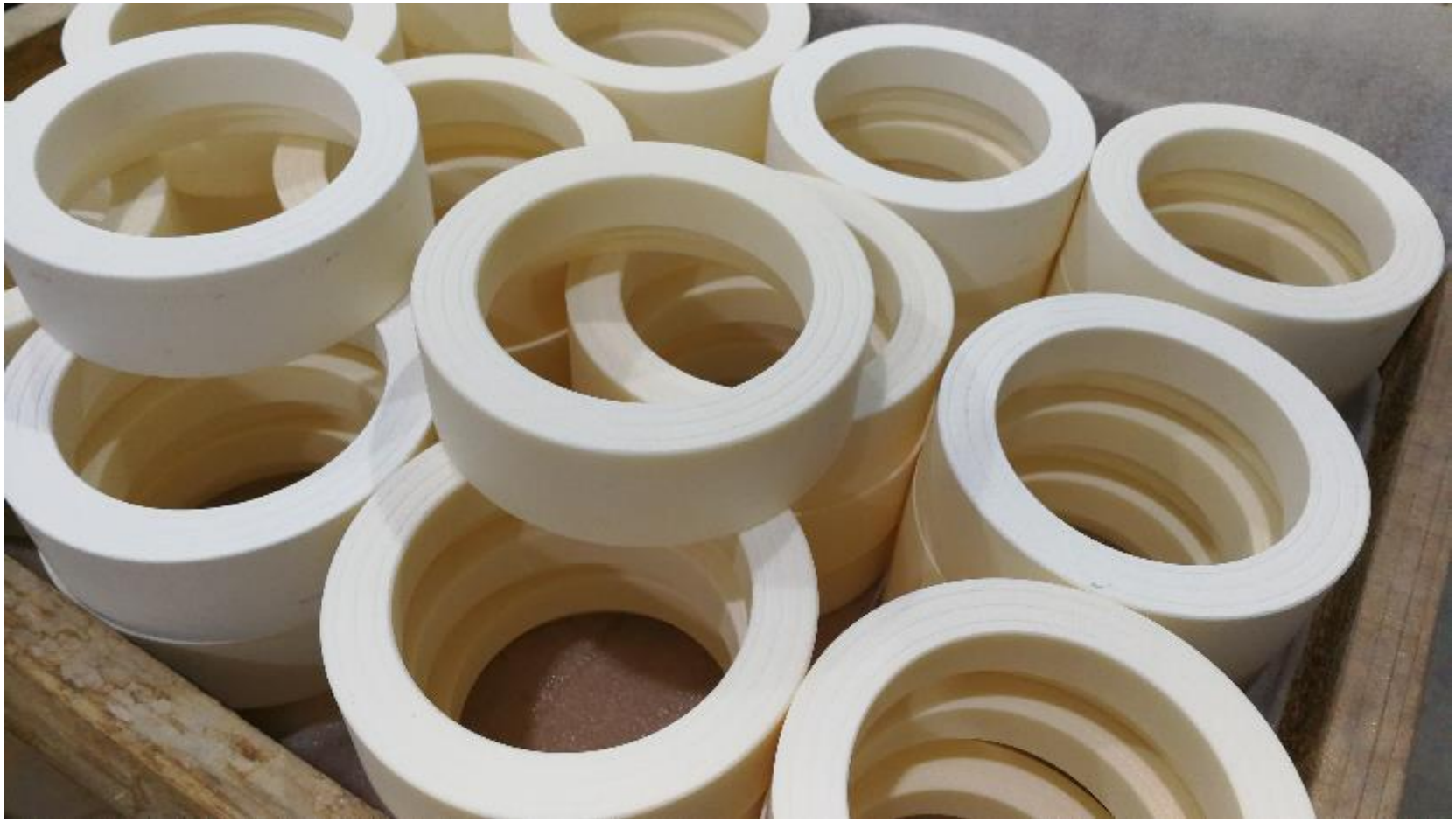


Company Profile of FOYO



Company Profile of FOYO

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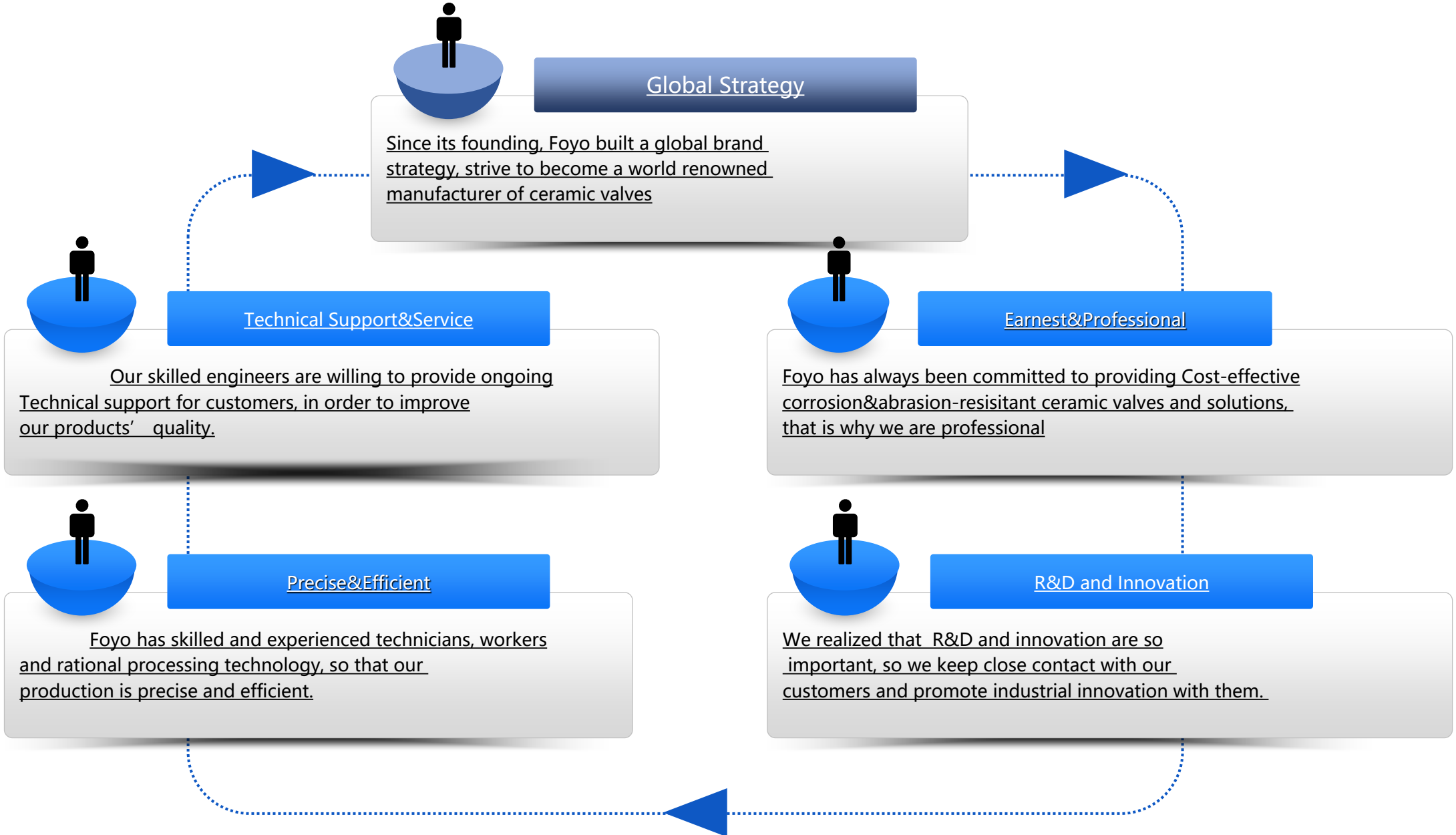
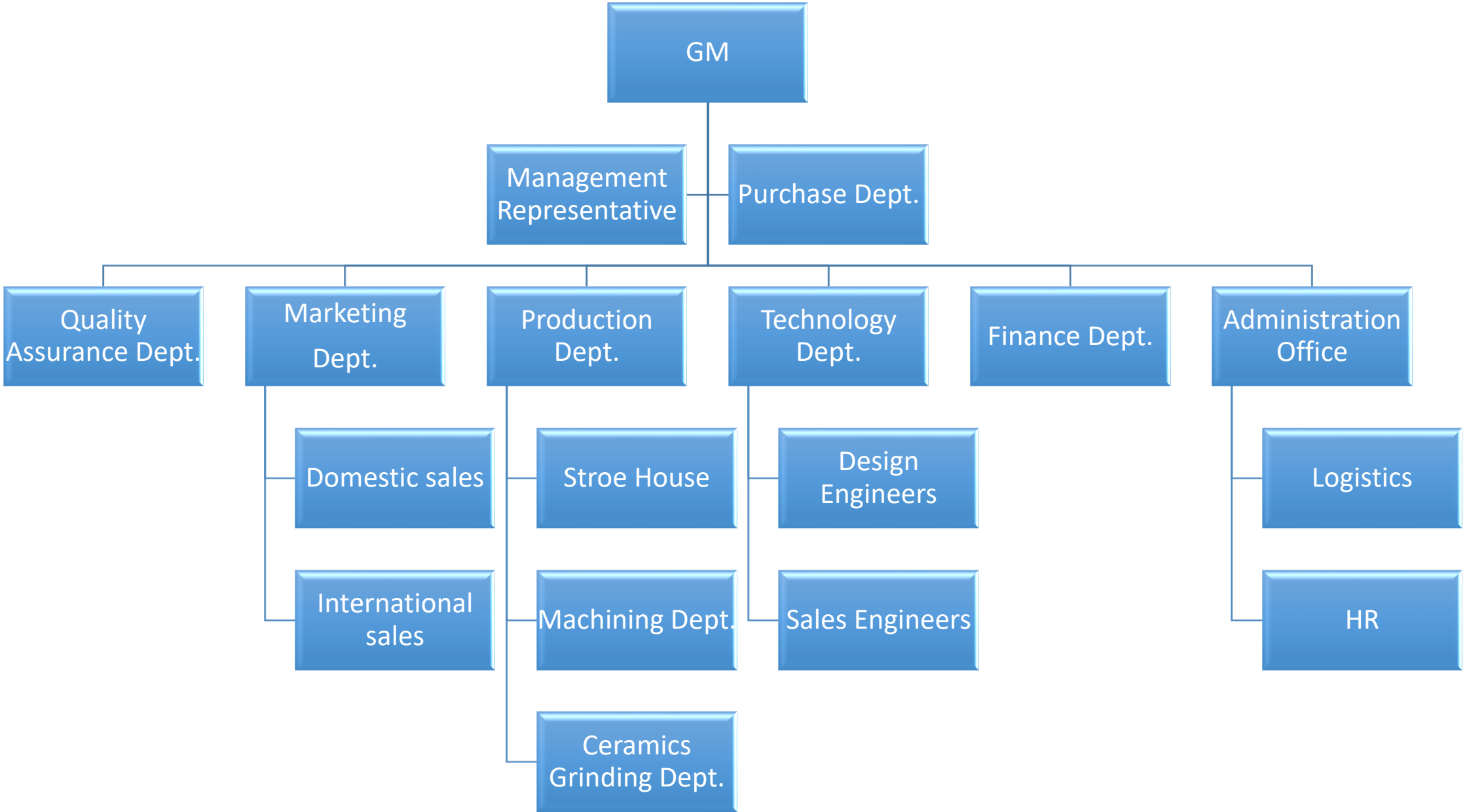
STRATEGY


Global Strategy
Since its founding, Foyo built a global brand strategy, strive to become a world renowned manufacturer of ceramic valves
Technical Support&Service
Our skilled engineers are willing to provide ongoing Technical support for customers, in order to improve our products' quality.
Earnest&Professional
Foyo has always been committed to providing Cost-effective corrosion&abrasion-resisitant ceramic valves and solutions, that is why we are professional
Precise&Efficient
Foyo has skilled and experienced technicians, workers and rational processing technology, so that our production is precise and efficient.
R&D and Innovation
We realized that R&D and innovation are so important, so we keep close contact with our customers and promote industrial innovation with them.

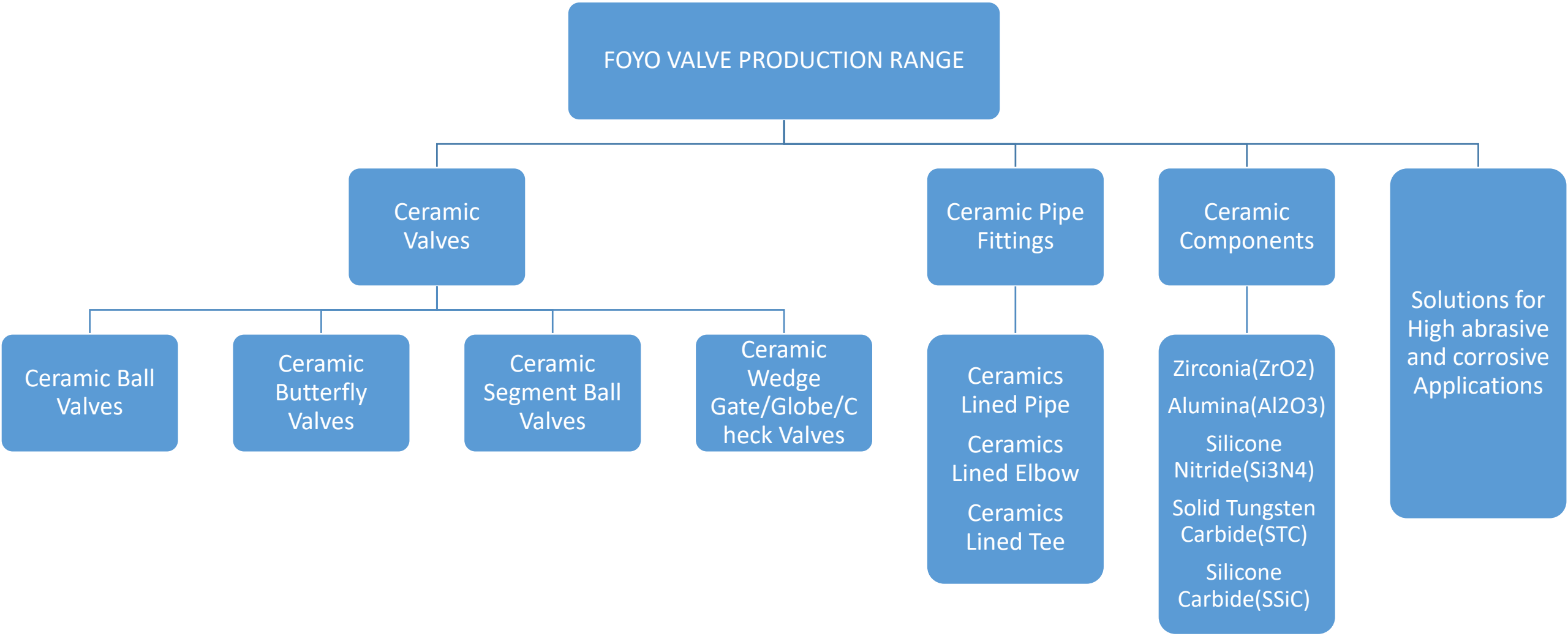
Organization Chart



02

Products

Production Range



Ceramics Lined Pipes

Ceramics Lined Pipe Fittings

Ceramics Lined Elbow

Ceramics Lined Diverter

Ceramic Components

Ceramic Components

1

ZrO2

2

>99%Al2O3

3

STC

STC—Solid Tungsten Carbide

4

Si3N4

Si3N4—Silicone Nitride

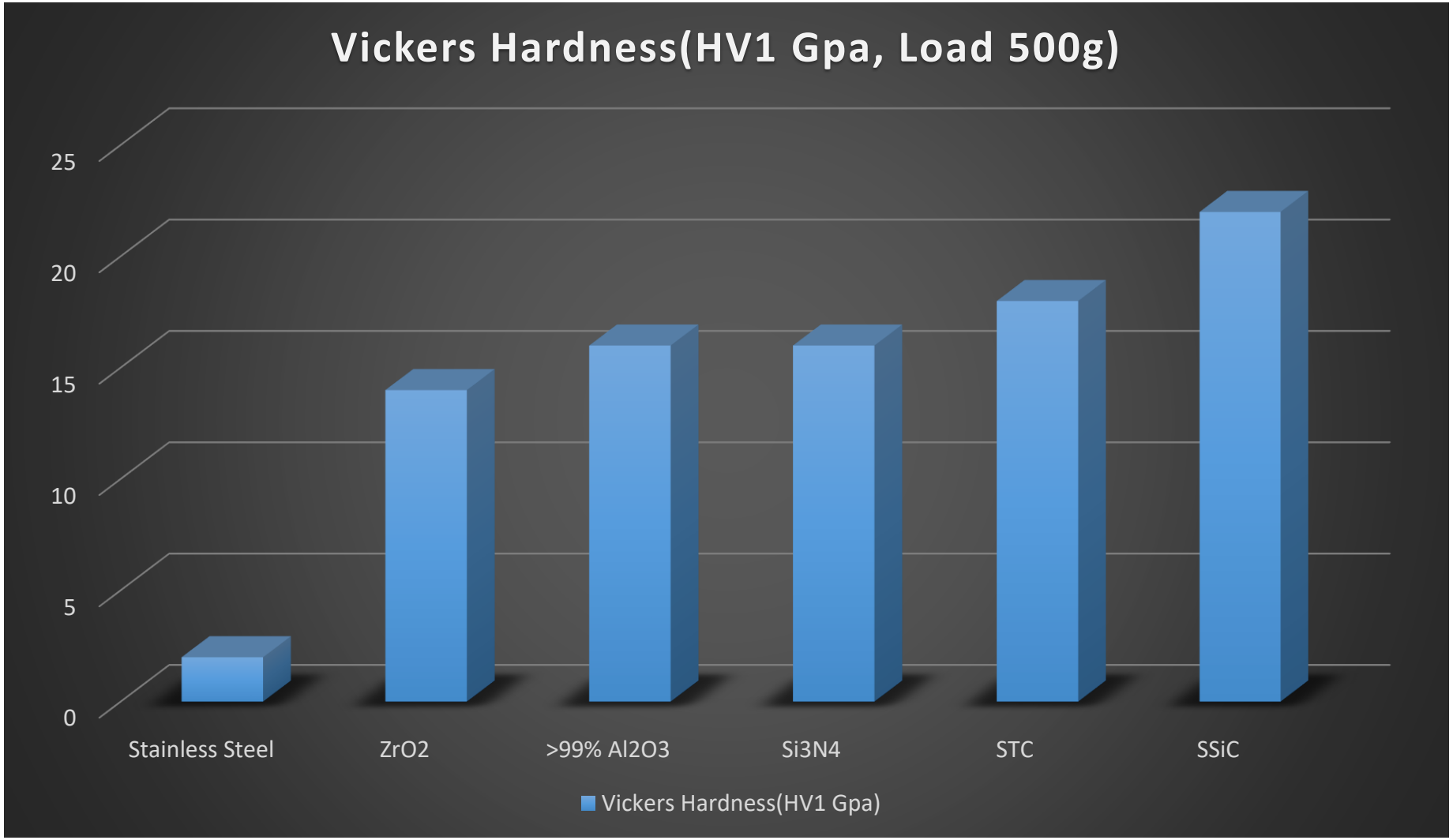
Ceramics Gallery

Corrosion Resistance Comparation

Medium	Temp.(℃)	99%Al2O3	ZrO2	STC	Si3N4	SS316	HC276
20%HCL	60	A	A	X	A	C	B
20%HCL	90	A	A	X	A	X	C
60%H2SO4	60	A	A	X	A	C	B
60%H2SO4	90	A	A	X	A	C	C
10%HF	60	B	C	X	C	C	B
50%HF	90	C	X	X	X	X	C
60%HNO3	60	A	A	X	A	A	C
60%HNO3	90	B	A	X	A	B	C
30%NaOH	60	A	A	B	A	A	A
30%NaOH	90	B	B	C	A	B	A

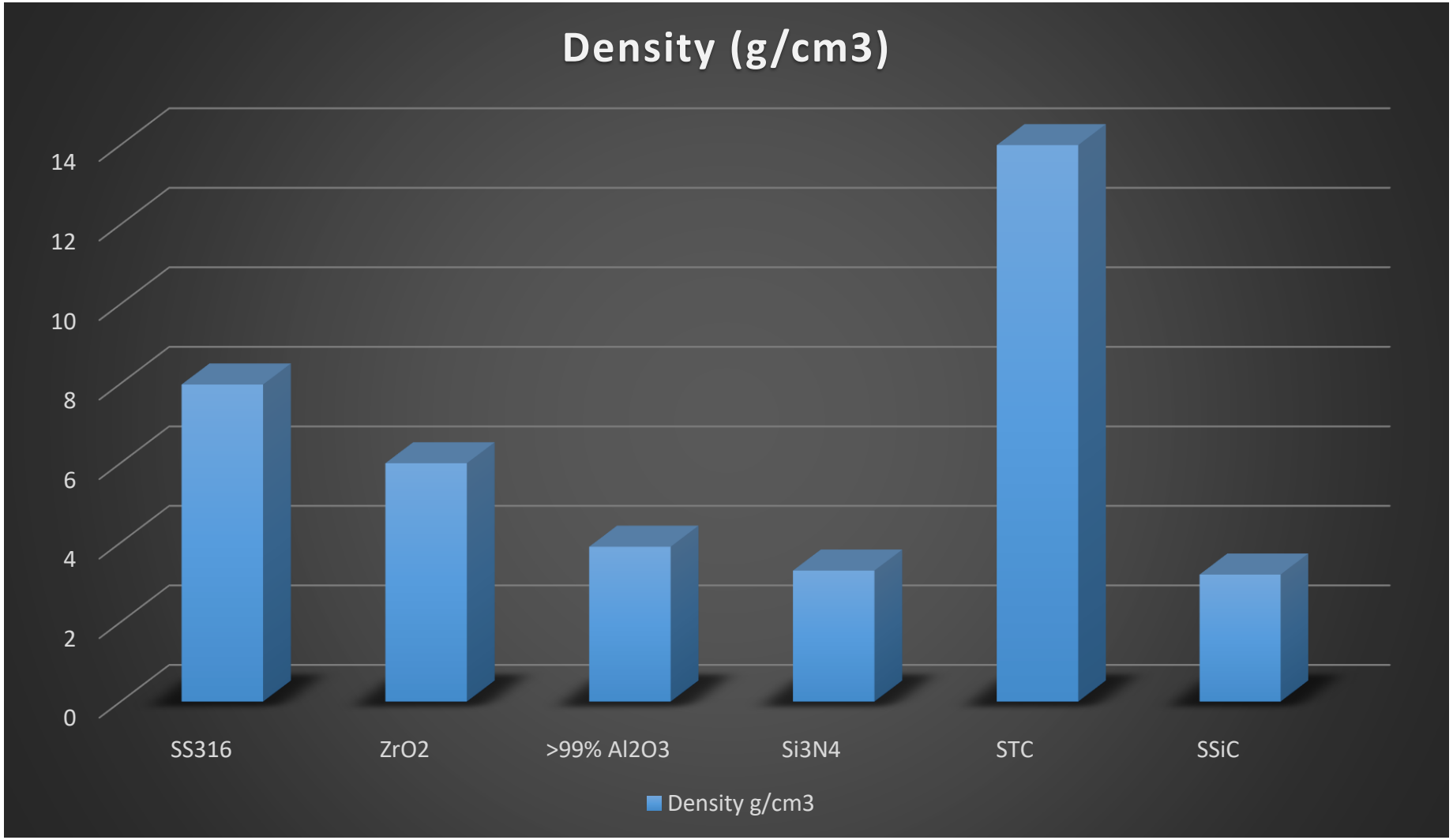
A- Negligible or no corrosion, recommended for valve use
B- Little or Slight corrosion, fitness for valve use
C- Significant corrosion, not recommended for valve use
X- Violent corrosion, not allowed for valve use

Hardness Comparation

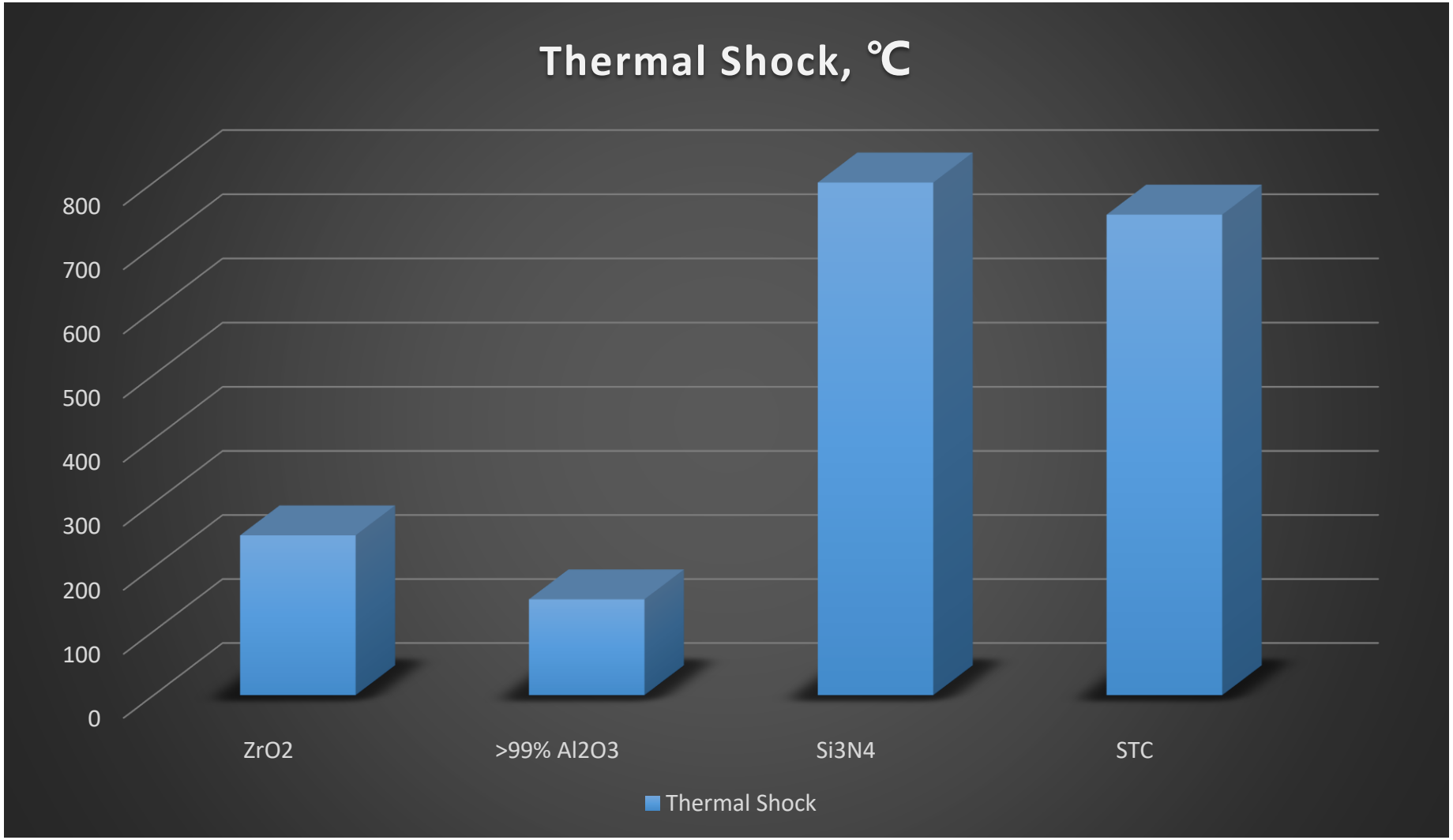


The wear and corrosion resistance of ceramics is much better than stainless steel

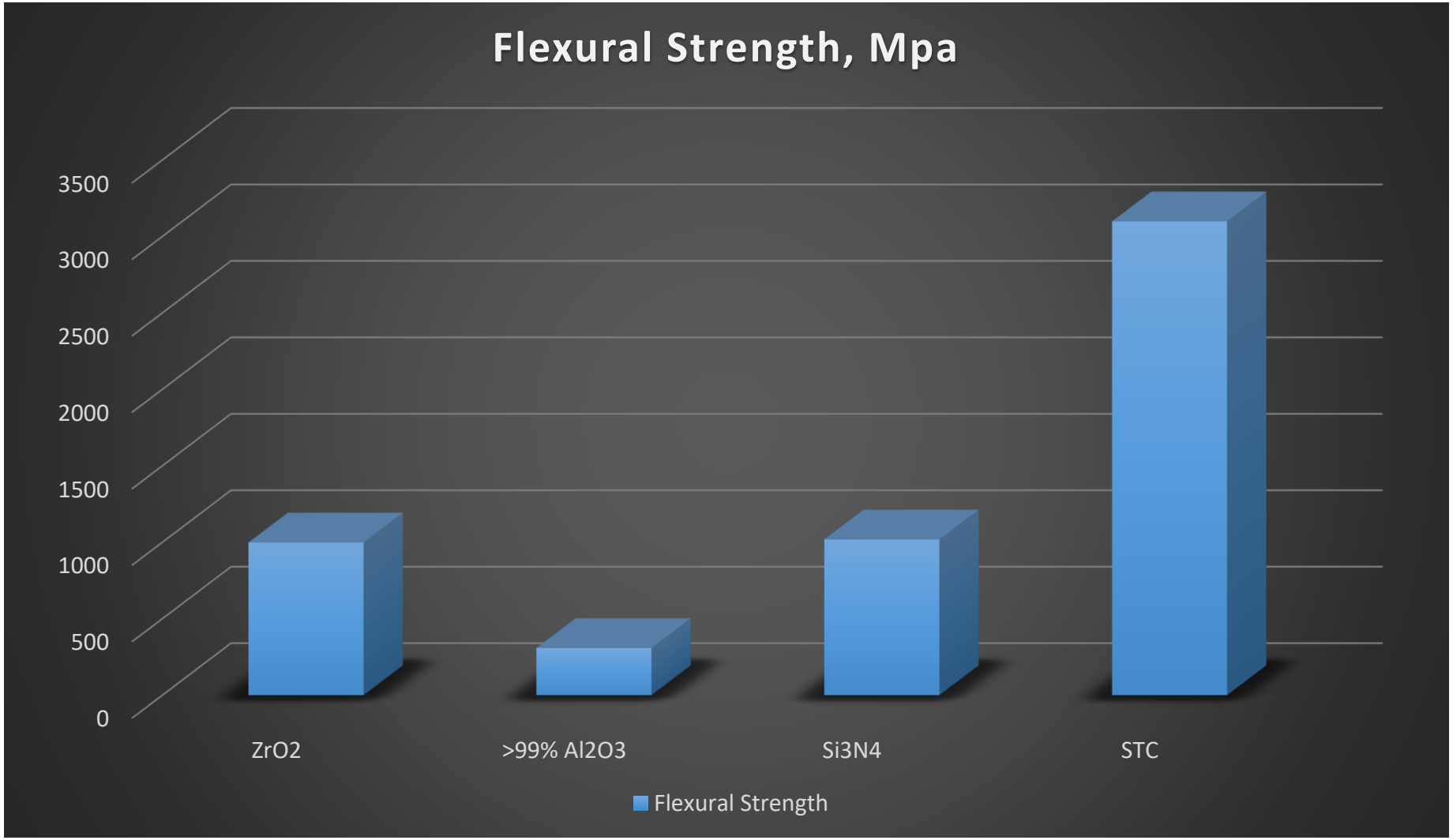
Density Comparation



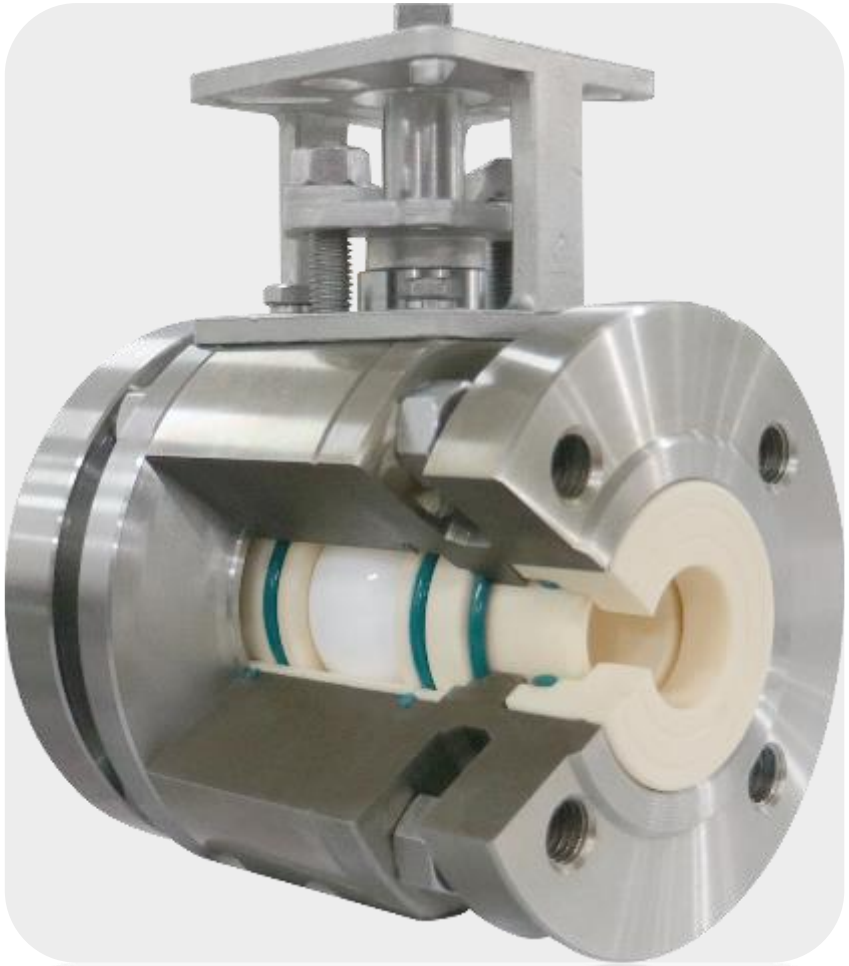
Thermal Shock



Flexural Strength



Ceramic Ball Valve



01

Construction

3PC-Design, flanged end and Face-to-Face Dim. are flexible as per customers' requirements.

02

Sizes Range

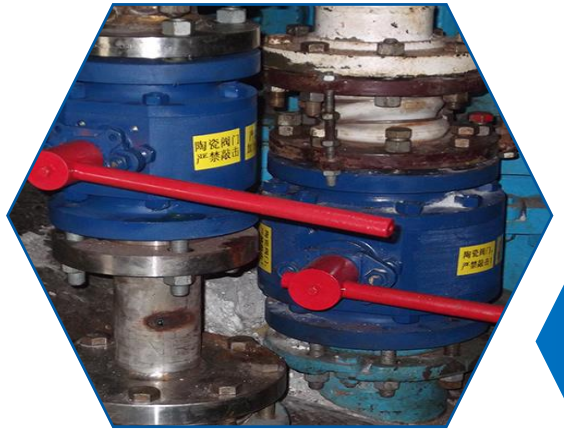
Size: DN15-DN300(1/2"-12")
Pressure Rating: Max. PN100(CL600)

03

Inspection & Testing

Pressure Test: API 598/ ISO 5208
Leakage Class: FCI 70-2, Class VI;
Tightness acc. To GOST A

Ceramic Ball Valve



01

Corrosion Resistant

- Will not interact with almost all organic and inorganic chemicals;
- Will not contaminate the process media;
- Keep physically and chemically stability against most acids and alkalis.

Abrasion Resistant

- Harder than most materials, only except diamond;
- Good Self-lubricating performance.

02

As valve trim, ceramic components make the valve done well in the most abrasive conditions thanks to their high hardness, such as coal powder, silicone powder, glass powder, Mg powder, positive/negative materials of lithium battery, etc.

Ceramic Ball Valve

Besides manual operated valves, bare stem, pneumatic and electric operation are all optional, actuators are mounted by a yoke interface that meets ISO 5211.

Lever Op.

100A and smaller size: Lever

125A and larger size: Gear Box

Pneumatic Op.

Actuator: FT(CN), Festo(DE)

Solenoid Valve: VAA(USA),SMC(JP)

Filter&Regulator: SMC(JP)

Limit Switch: VAA(USA), HKC(S.Korea)

Positioner: YTC(S.Korea), Simens(DE)

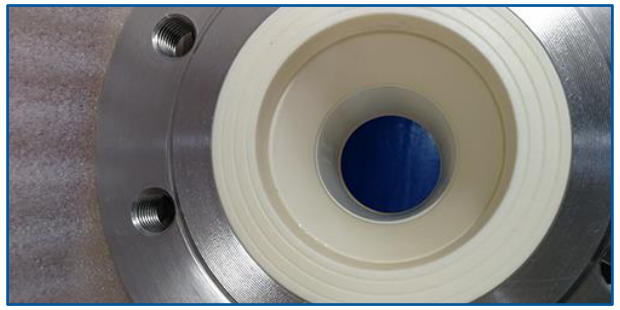
Electric Op.

Actuator： LanLee(CN), Rotork(UK)

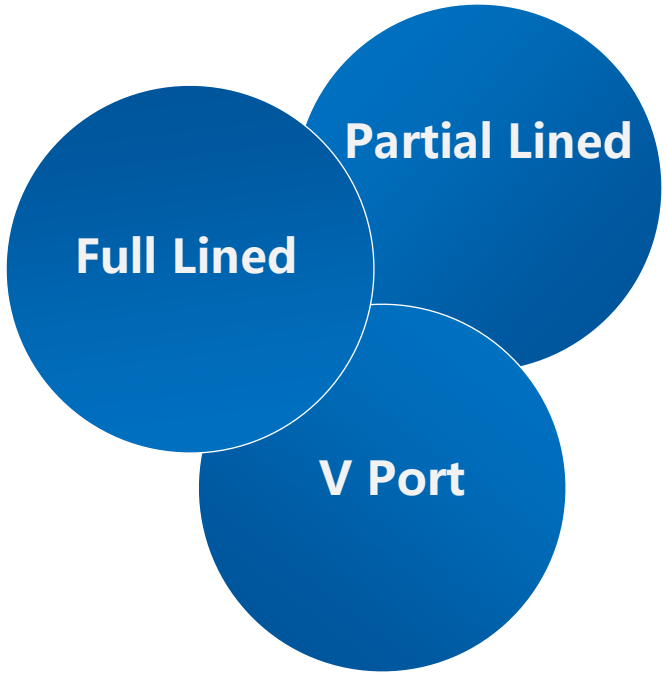
Auma(DE)

Ceramic Ball Valve

Full Lined Ceramic Ball Valve



All wetted parts are ceramics, medium will not be contaminated by metal impurities.

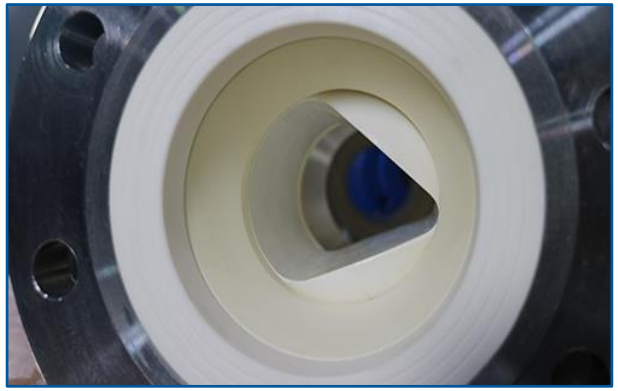


Partial Lined Ceramic Ball Valve

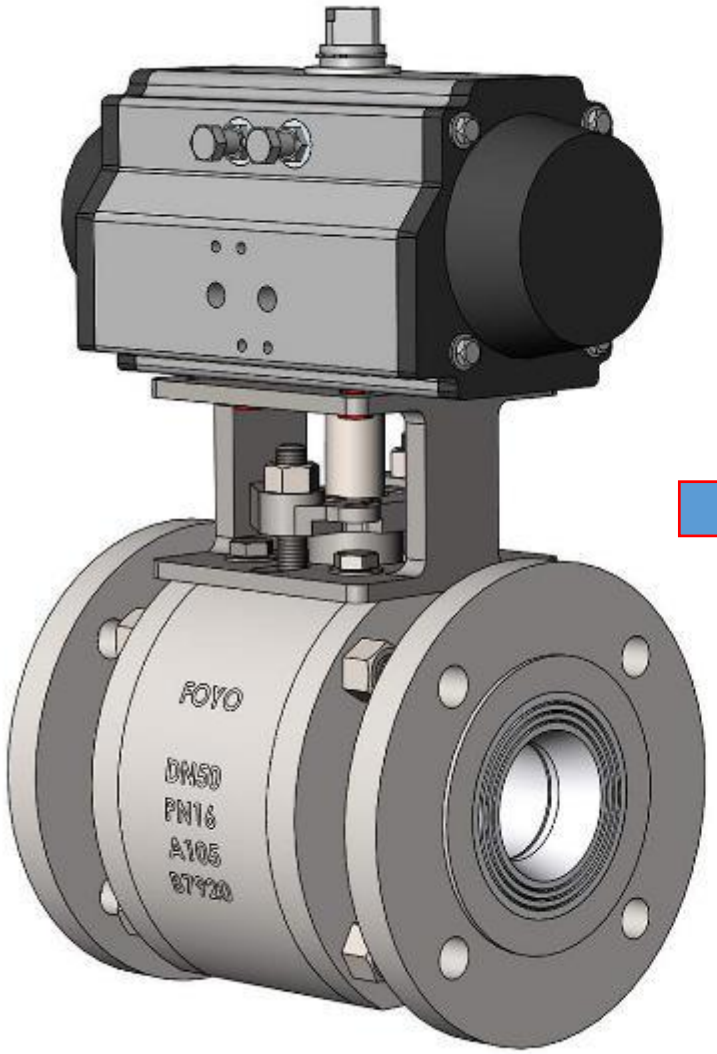
Only ball and seats are ceramics, designed for slight wear and corrosion.

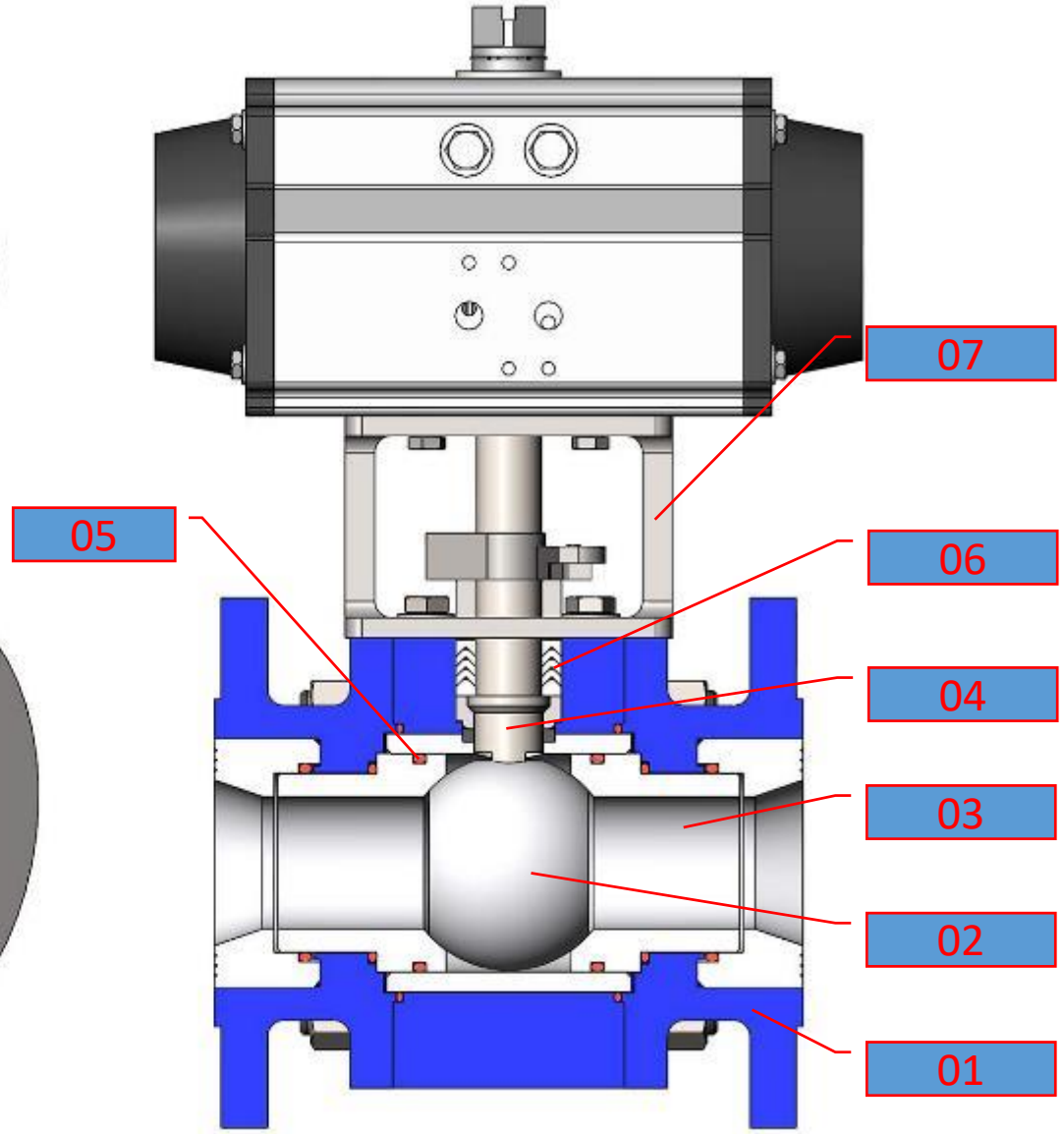
V Port Ceramic Ball Valve

Designed as control valve, has equal percent(EQ%) flow characteristics.



Full Lined Ceramic Ball Valve





01 Body

- A105, SS304, SS316, SS316L

02 Ball

- >99%Al2O3, ZrO2, STC, Si3N4

03 Seat and Lining

- >99%Al2O3, ZrO2, STC, Si3N4

04 Stem

- SS304, SS316, 17-4PH, SS316L, HC276, Ti, Zr

05 O-Ring

- VMQ(Silicone Rubber), Viton(fluororubber)

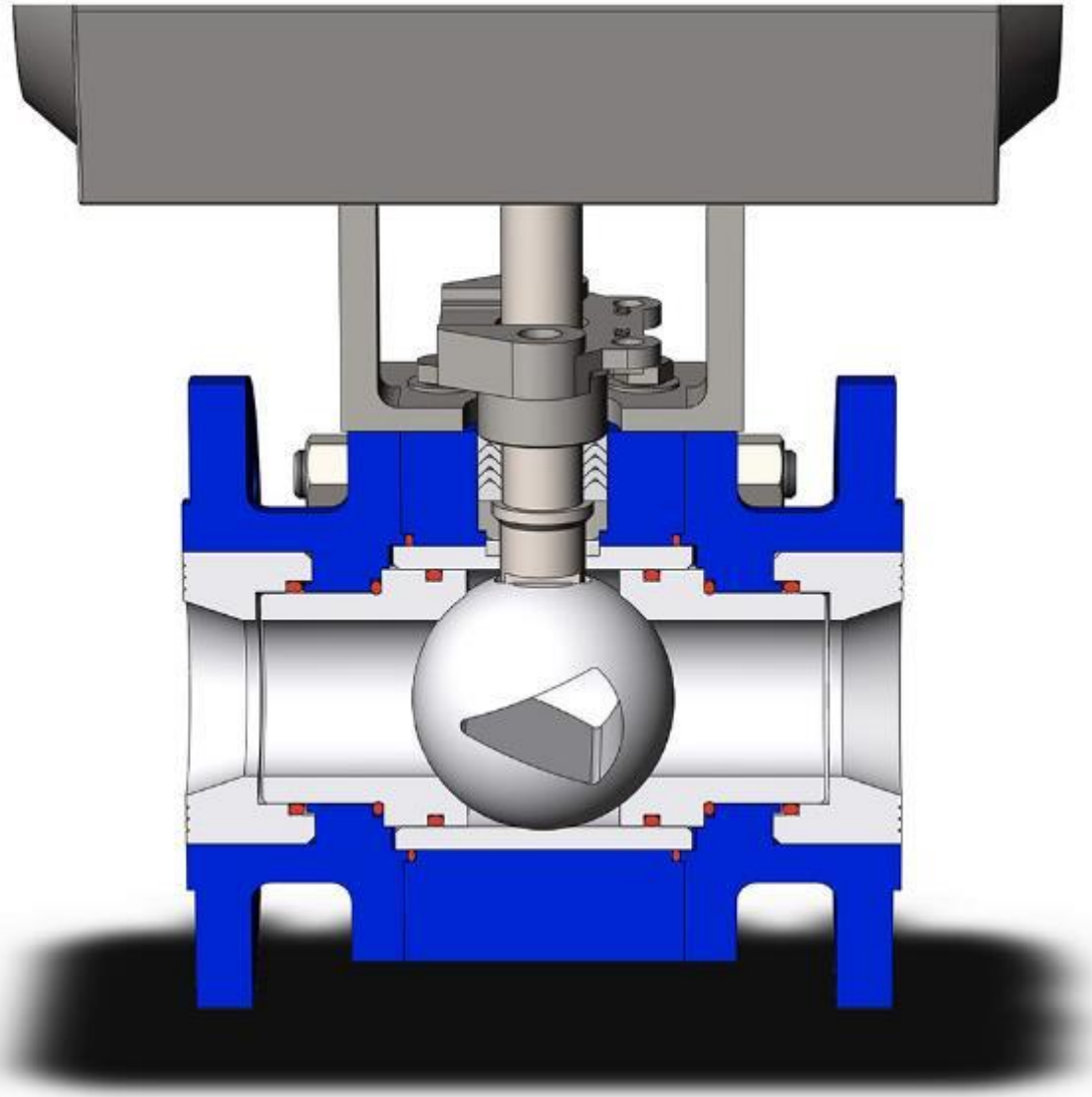
06 Packing

- PTFE, Graphite

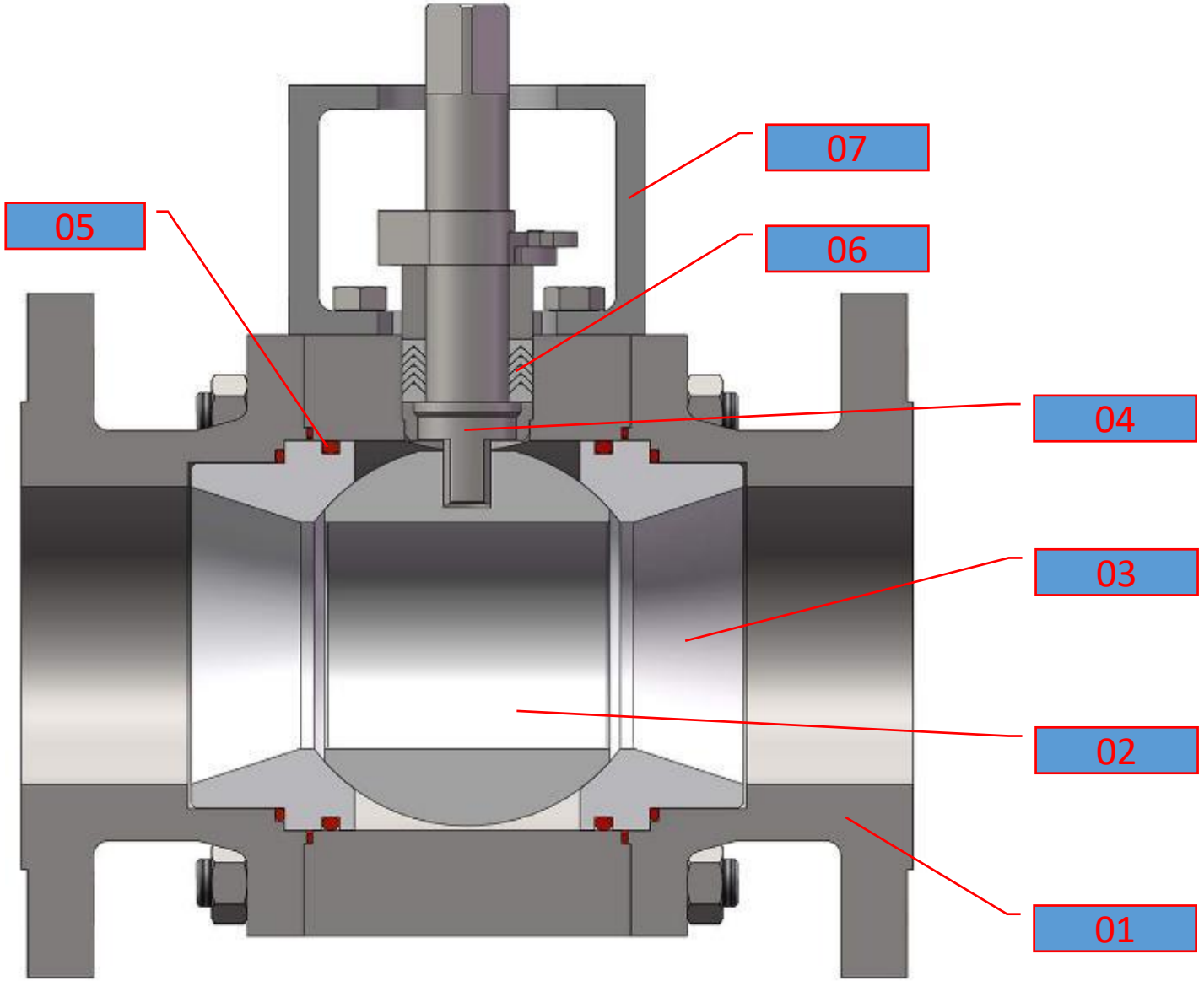
07 YOKE

- SS304

V Port Ceramic Ball Valve



Partial Lined Ceramic Ball Valve



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- SS304, SS316, 17-4PH, SS316L, HC276, Ti, Zr

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- VMQ(Silicone Rubber), Viton(fluororubber)

06 Packing

- PTFE, Graphite

07 YOKE

- SS304

Lever Operated Ceramic Ball Valve

Bare Stem Ceramic Ball Valve

Gear Box Op. Ceramic Ball Valve

Pneumatic Ceramic Ball Valve

Electric Ceramic Ball Valve

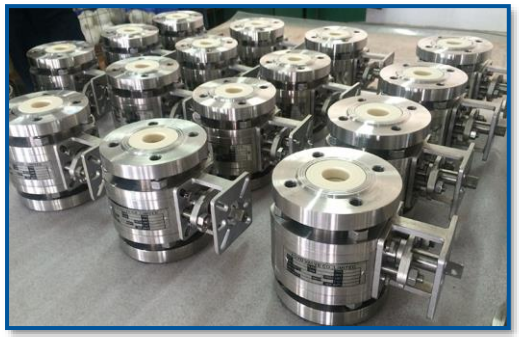
High Pressure Ceramic Ball Valve

V-Port Ceramic Control Ball Valve

Ceramic Butterfly Valve

Ceramic Segment Ball Valve

Ceramic Ball Valves Gallery



Ceramis Lined Pipe Fittings and Ceramic Parts

03

Management and QC

Document List of Company Management and QC

1. System Quality Analisys	2. Commitment of Managers	3. Definitions of Authorities and Responsabilities	4. Control System documentation and standards
5.Control of records	6.Treatment of nonconformities and corrective and preventive actions	7.Handling customer complaint	8.Critical analysis of the contract with customers focus on
9.Planning product quality	10.Human Resources for the project	11. Technical Support	12.Domain technological design
13.Standardized Documentation	14.Manufacturing Tecnology Process	15.Mounting procedures	16.Final Inspection and Tests

To be continued……

Document List of Company Management and QC

continued

17.Resources and systematic conditioning of shipment, preservation and transportation

18.Systematic identification and traceability

19.Human Resources for production

20.Requirements for qualification of inspectors Dimension

21.Specification for purchase of critical inputs

22. specification for incoming inspection and manufacturing subcontractors

23.Management of products and services provided

24.Manufacturing Capacity

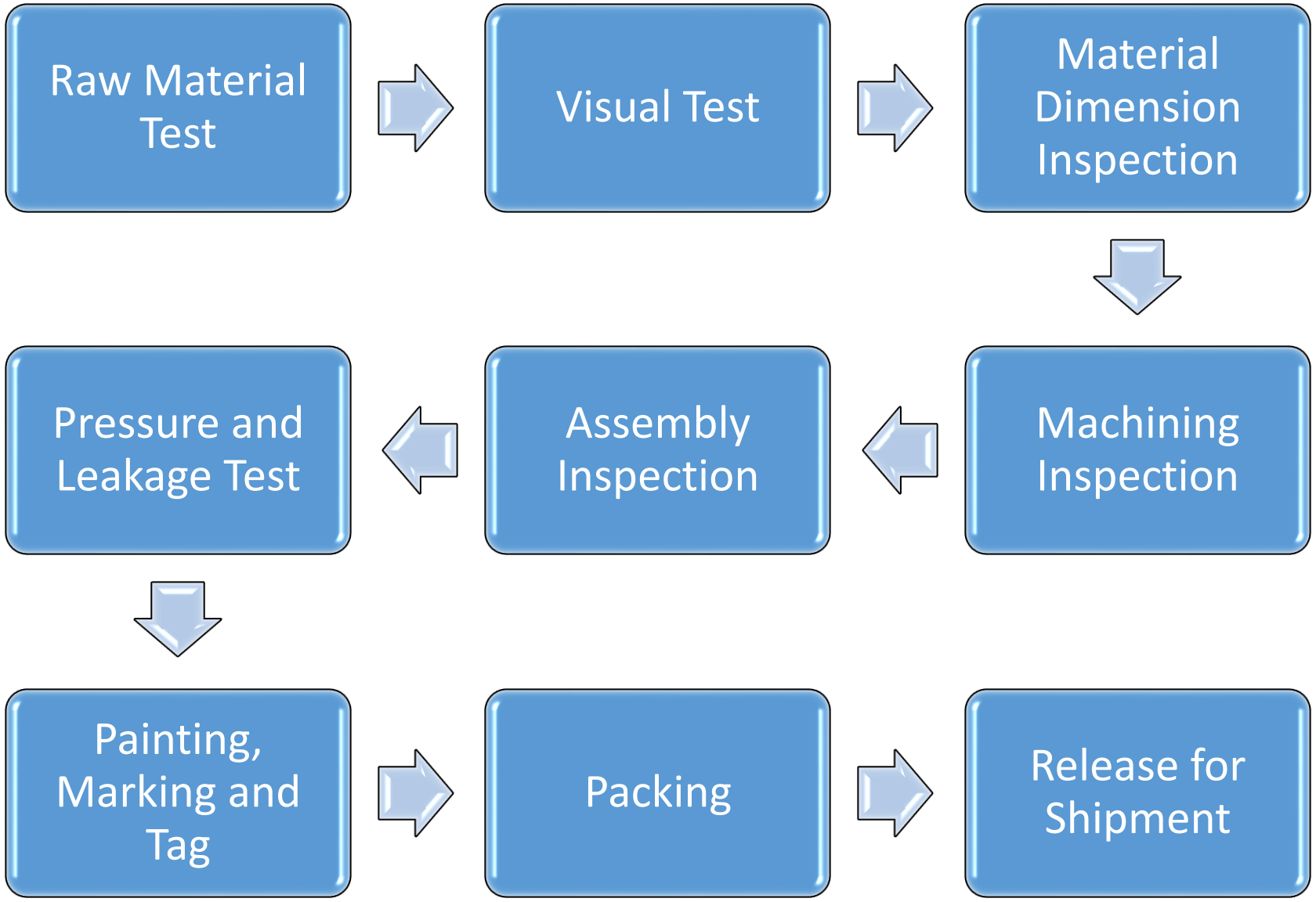
25.Machinery

26.Hall of metrology and dimensional control instruments

27. Availability of calibrated tools and equipment

Please ask for any of above documents from FOYO if needed

Quliaty control inspection plan



Quliaty control inspection plan

Management System			
(*Quality system*)	■*ISO9000*□*TQC*	*Review of Quality system*	□*internal ordit*■*external ordit* □ *self-checking*
(*Planning*)	■*plan* □*implement*	*Work instructions*	■*procedure*□*rule*□*duty*
(*Design control*)	□*procedure*■*duty*	*Doc and change control*	■*procedure*□*rul*□*duty*
(*Procurement control*)	■*before order*□*after order*	*Vendor Qualification*	□*procedure*■*rul*□*duty*
(*Calibration*)	■*periodical* □ *aperiodicity*	*Indication inspect status*	■*procedure*□*rul*□*duty*
(*Final inspection*)	□*casual*■*100%*	*Non - conformance control*	■*procedure*□*rul*□*duty*
(*Training*)	■*periodical* □ *aperiodicity*	*Handling & Storage*	□*procedure*□*rul*■*duty*

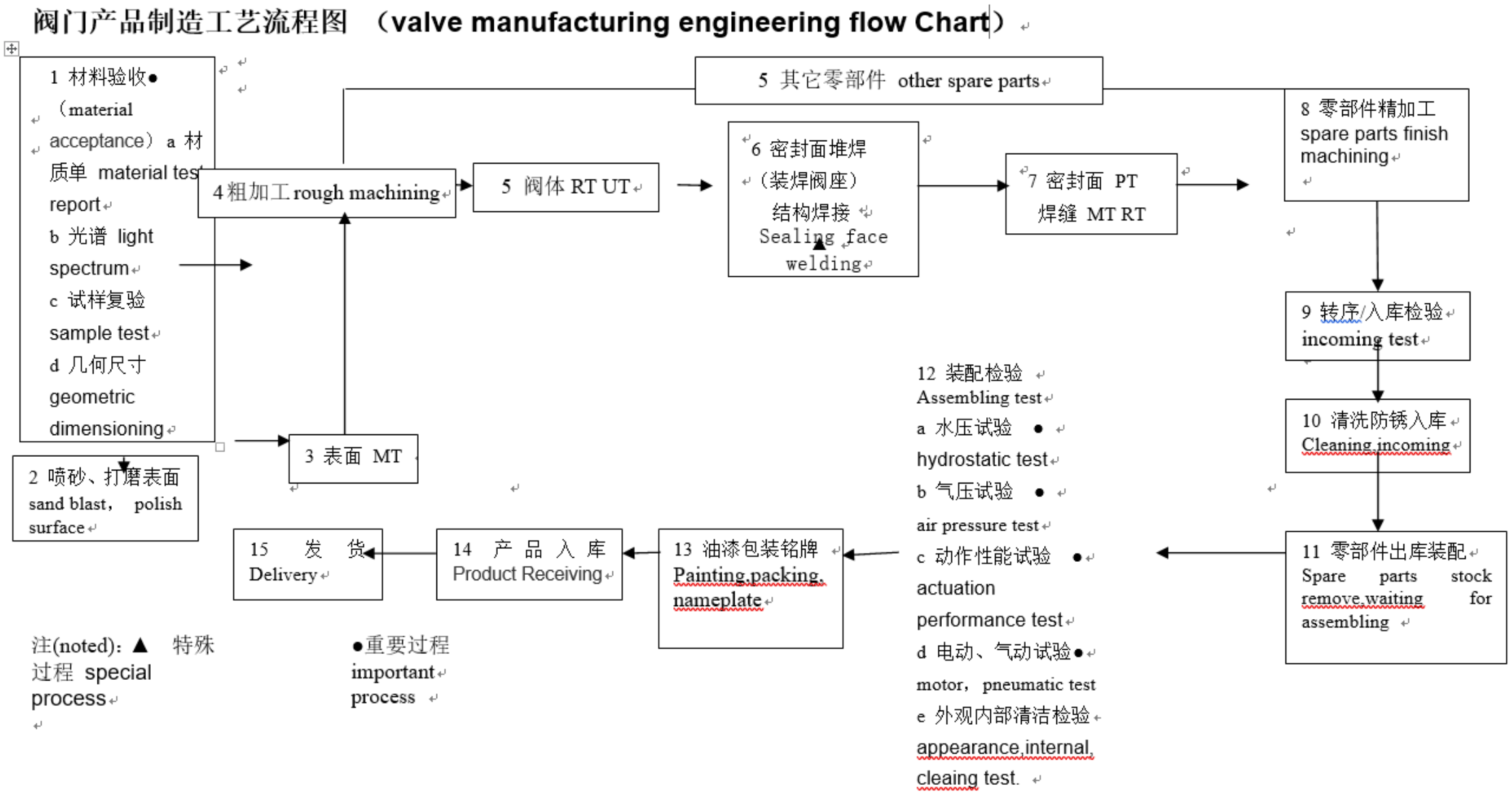
Quliaty control inspection plan

Quliaty control inspection plan

FOYO	INSPECTION & TEST PLAN			ITP NO.: Order NO.:	Page 1 of 1			
No	Activity	Sampling	Standard	Record	Activity code & sign			
					FOYO		Customer	
					Code	sign	code	sign
1	Documentation - Technical Drawing - Inspection Test Plan	100%	-	-	M		R	
2	Raw Material test	Body / bonnet / stem / bal l/ disc / seat, Chemical analysis / Mechanical characteristics	EN10204 3.1 Applicable ASTM STD.	mill certificate / PMI inspection report/ Tensile test	M		H/R	
3	Visual test	Body / bonnet / stem / bal l/ disc / seat 100% inspection on appearance. Require casting marking layout size, pressure, brand,flow,material,flow, heat No. Visual internal and external surfaces of castings shall be no defects with pore, loose, hollow etc.	MSS-SP-55	Material inspection report	M		W/R	
4	Material dimension inspection	Body / bonnet / ball / disc / seat / stem connection dimension. Machining tolerance, thickness	ASME B16.10, ASME B16.5, specification.	Material inspection report	M		R	
5	Machining inspection	Body / bonnet / ball / disc / seat / stem each connection machining dimension tolerance, roughness.	ASME B16.10, ASME B16.5, Manufacturer technical drawings.	Machining inspection report	M		R	
6	Assembly inspection	Keep body cavity cleanness. Trim material is conformed.	order specified	Assembly inspection report	M		W/R	
7	Pressure and leakage test	Hydraulic shell test Hydraulic seat est Pneumatic seat test (If applicable);	API598,order specified	Pressure testing report	M		H/R	
8	Paiting, Marking and Tag	100%	Manufacturer standard.	Record	M		W/R	
9	Packing	100%	Material shall be properly packed for Air/Sea Transportation.	Record	M		W/R	
10	Release for Shipment	100%	-	-	M		R	

Where:
M= Manufacturer's Inspection/Implementation R = Document/inspection report review and approved
W = Witness inspection SW=Sample witness H= Hold point

Valve Manufacturing Engineering Flow Chart



Valve Manufacturing Engineering Flow Chart

FOYO

FOYO VALVE CO.,LTD. 博艺欧厦门阀门有限公司	**Machining Procedure Card** **机械加工工艺过程卡片** **（范围）**	Commodity 产品名称	Gate Valve 明杆楔式单闸板闸阀	Sapre Part 零件名称	Body 阀体	Code 编号	A09-00387
		Type 产品型号	Z40H	Pressure Range 压力范围	—	Bore Range 口径范围	—
		Material 材料	Casting , WCB 铸件，WCB	Remark 备注		共 1 页	第 1 页

工序号 ITEM	Process Name 工序名称	Process Content 工序内容	设备类型 Equipment	Tooling 工艺装备	Application 适用范围	Remark 备注
1	Cast 铸造	Heat Treatment after casting 铸造后退火。				
2	Machining 车	Machine the flange , cramp one end of the flange , machine the O.D. of the flange . 粗车端法兰：夹一端法兰外圆，找正另一端法兰端面及内孔，车端法兰外圆	Machining 车床			
		Reserve some 及反平面至尺寸，端面留余量，倒角。				
3	Maching 车	Machine the flange , 粗车端法兰：以已车端法兰外圆定位，车另一端法兰外圆及反平面至尺寸，	Machining 车床	Convex die centre 凹定心盘		
		Reserve some excess for the end , beveled end 端面留余量，倒角，				
4	Machining 车	Rough machine the end of the flange 粗车端法兰：以两端法兰外圆定位，以导轨、中法兰内孔、端面找正，车中	Machining 车床	Machine the clamp of the middle flange 中法兰车夹具		
		Outside of the flange 、Oppsite to the size , Reserve some excess on the end, beveled end 法兰外圆、反平面至尺寸，端面留余量，倒角。				
5	Machining 车	Machine the valve seat hole 车阀座孔：以一端法兰外圆定位，中法兰端面找正，车一端阀座孔至尺寸，	Machining 车床	Adjustable Die Centre 可调定心盘，斜垫铁		
		Machine the other end of the valve seat hole 控制总宽尺寸：调头：车另一端阀座孔，控制全宽尺寸。				
6	Drilling 钻	Drill the hole of both end of flange 钻两端法兰各孔至尺寸。	Drilling 钻床	Drilling Pattern 钻模		
7	Planing Machine 刨	Plan machine the both guide surface to size 刨阀体两导轨面至尺寸。	Planing Machine 刨床			

										Compile(Date) 编制（日期）	Audit(Date) 审核（日期）	Standardise(Date) 标准化（日期）	Countersign (Date) 会签（日期）	Approval(Date) 批准（日期）
Remark 标记	No. 处数	Document Revision No. 更改文件号	Signature 签字	Date 日期	Remark 标记	Number 处数	Document Revision No. 更改文件号	Signature 签字	Date 日期					

Quality Meeting Record Form

FOYO

ZL010

Quality Meeting Record

№：QA-20160510

Meeting subject								
Date					Place			
preside over					Time			
Attendance	Name	Department	Position	Note	Name	Department	Position	Note
Records								

Recorded by：

Test Certificate Form

TEST CERTIFICATE
EN 10204 3.1B.

(DIN 50049-3.1B)

Client: DaehanCVD Co.,Ltd Order No.: 163042/163052 Date:May.10th.2016 No.:1

Item No.	Q'ty (PCS)	Description	Pressure	Size	Material				Hydrostatic Test		Air Test	Result
					Body	Ball	Stem	Seat	Body (Mpa)	Seat (Mpa)	Seat (Mpa)	
1	1	Ball valve,RF	150#	1"	A105	Ceramics	C276	Ceramics	3.0	2.2	0.6	OK
2	1	Ball valve,RF	150#	2"	A105	Ceramics	17-4PH	Ceramics	3.0	2.2	0.6	OK

Item No.	Series No.	Name of Part	Heat No.	Chemical Composition(%)											Mechanical Properties				
				C	Si	Mn	P	S	Cr	Ni	Mo	Cu	V	Others	Tensile Strength	Yield Point	E%	R (%)	HB
1	/	BODY	/	0.20	0.30	0.85	0.012	0.013	0.068	0.012	0.005	0.009	0.002	/	555	290	33	37	162
		BONNET	/	0.20	0.30	0.85	0.012	0.013	0.068	0.012	0.005	0.009	0.002	/	555	290	33	37	162
2	/	BODY	/	0.20	0.30	0.85	0.012	0.013	0.068	0.012	0.005	0.009	0.002	/	555	290	33	37	162
		BONNET	/	0.20	0.30	0.85	0.012	0.013	0.068	0.012	0.005	0.009	0.002	/	555	290	33	37	162

Remarks: We hereby certify that the material described above has been tested and complied with the terms of the order contract

Inspection Report Form

FOYO VALVE CO.,LIMITED

INSPECTION REPORT											
No	Item Name / Actual Value	Ball valve									
		Left	Right								
1	Logo DH-CVD	DH-CVD									
2	Size NPS 2	2									
3	Rating CALSS 150	150									
4	Body material A105	A105									
5	Body heat No Actual copy	N/A									
6	Cleanness of inner chamber	√									
7	Appearance bright and clean degree	√									
8	Wall thickness	√									
9	Middle slotting	√									
10	Bolt uniformity	√									
11	Stem uniformity	√									
12	The handwheel cooperation degree	√									
13	The switch of flexibility	√									
14	Open direction	√									
15	Open valve degree	√									
16	Face to Face L=254	254.1									
17	End flange outside diameter D1=150	149.8	149.9								
18	Bolt hole circle diameter D2=120.7	120.7	120.7								
19	Convexity diameter D3=92.1	92.1	92.0								
19	End flange outer diameter NPS1=50	50	50								
21	End flange inner diameter NPS2=40	40	40								
22	End flange thickness t=18	18.2	18.2								
23	Convexity height f=2	2	2								
24	Number of bolts n=4	4	4								
25	Bolt diameter d=18	18	18								
26	Shell test (water) 3.0 MPa / 15S	√									
27	Seal test (water) 2.2MPa / 10S	√	√								
28	Seal test (air) 0.6 MPa / 15S	√	√								

Remark:

Inspector: Date: Signature:

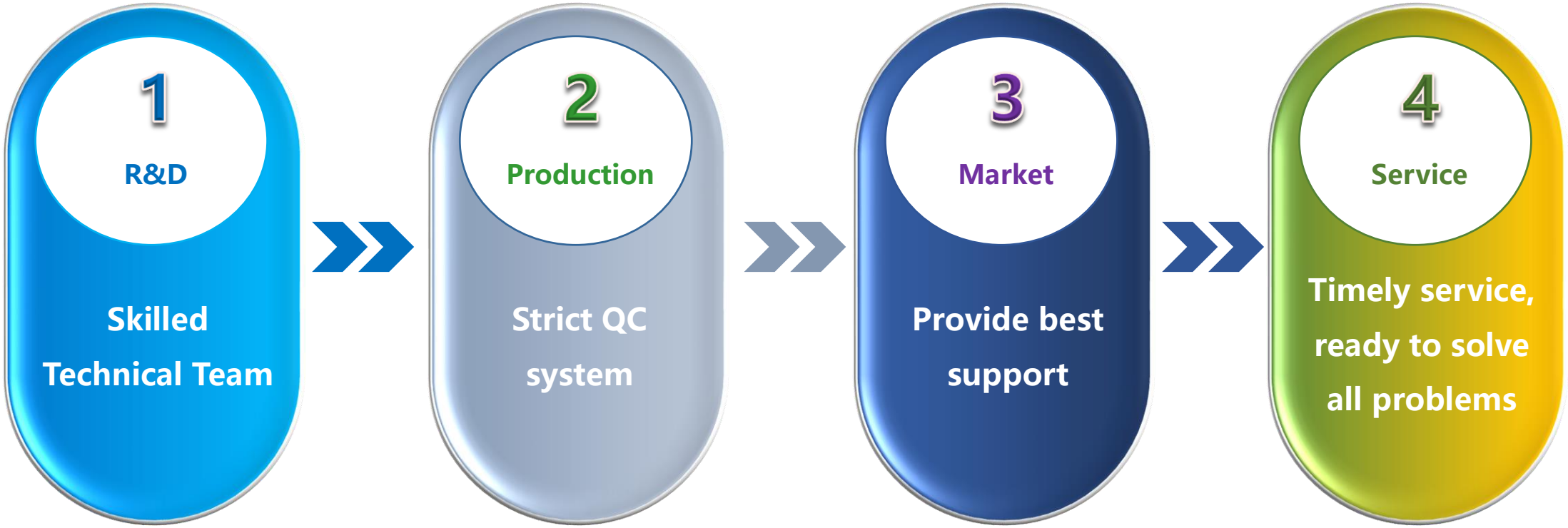
Manufacturing Capacity

Typical products	Dimensions and pressure
Ceramic ball valve	DN15-300(1/2”-12”)/PN10—PN100(CL150-CL600)
Ceramic segment ball valve	DN15-400(1/2”-12”)/PN10—PN40(CL150-CL300)
Ceramic butterfly valve	DN15-300(1/2”-12”)/PN10—PN16(CL150)
Ceramic gate valve	DN15-300(1/2”-12”)/PN10—PN100(CL150-CL600)
Ceramic double disc valve	DN15-300(1/2”-12”)/PN10—PN16(CL150)
Ceramic globe valve	DN15-200(1/2”-8”)/PN10—PN100(CL150-CL600)
Ceramic check valve	DN15-300(1/2”-12”)/PN10—PN100(CL150-CL600)
Ceramic pipe and fittings	DN15-300(1/2”-12”)/PN10—PN100(CL150-CL600)

Manufacturing Capacity

Main Equipments		
Description	Specification	Q'ty
Lathe	Max. OD 320mm,Max. Length 750mm	12
Lathe	Max. OD 400mm,Max. Length 750mm	5
Lathe	Max. OD 660mm,Max. Length 750mm	1
Milling machine	Stroke (x/y/z)810/385/406mm	3
Milling machine	Stroke (x/y/z)720/385/350mm	8
Milling machine	Stroke (x/y/z)720/430/650mm	2
Milling machine	Stroke (x/y/z)900/450/400mm	1
Drilling machine	Max. Diameter 40mm， Max. Depth 500mm	2
Grinding machine	Max. OD 200 mm,Max. Length 500mm	5
Grinding machine	Stroke（x/y/z）380/180/200	3
Grinding machine	Stroke（x/y/z）500/190/200	1
Grinding machine	Max. OD 180，Stroke（x/y）180/150mm	3
Tapping machine	Stroke（x/y/z）250/130/130mm	1
Air compressor	Displacement 0.85m^3/min， Air Supply 0.8MPa(max.)	1
Sand blasting machine	Rotating speed 0—3000r/min	4
Vernier calipers	Measuring range 0—500mm, Accuracy 0.02mm	100
microcalliper	Measuring range 0—200mm， Measuring Accuracy 0.01mm	70
Digital altimeter	Measuring range 0—500mm， Accuracy 0.001mm	2
Roundness meter	Measuring range 0—10mm， Accuracy 0.01mm	3
sclerometer	TT100	1
Thickness tester	HIN200	1
Valve Test Machine	Max. Test DN 1000mm(max.)， Max. Test Pressure 25.0Mpa(max.)	1

SERVICE



Warranty

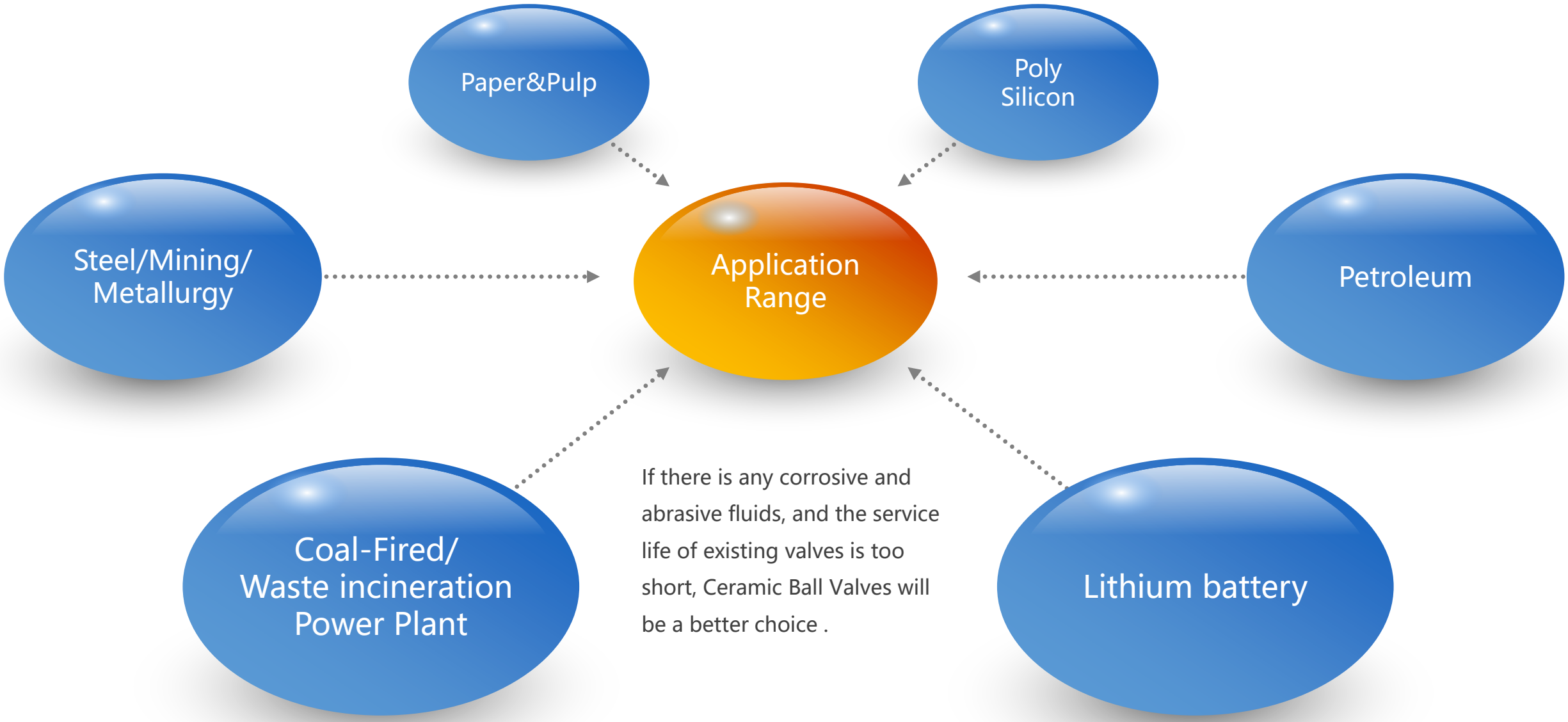
Strict quality assurance system

Generally Foyo provide more than 12 months for all of our ceramic valves

04

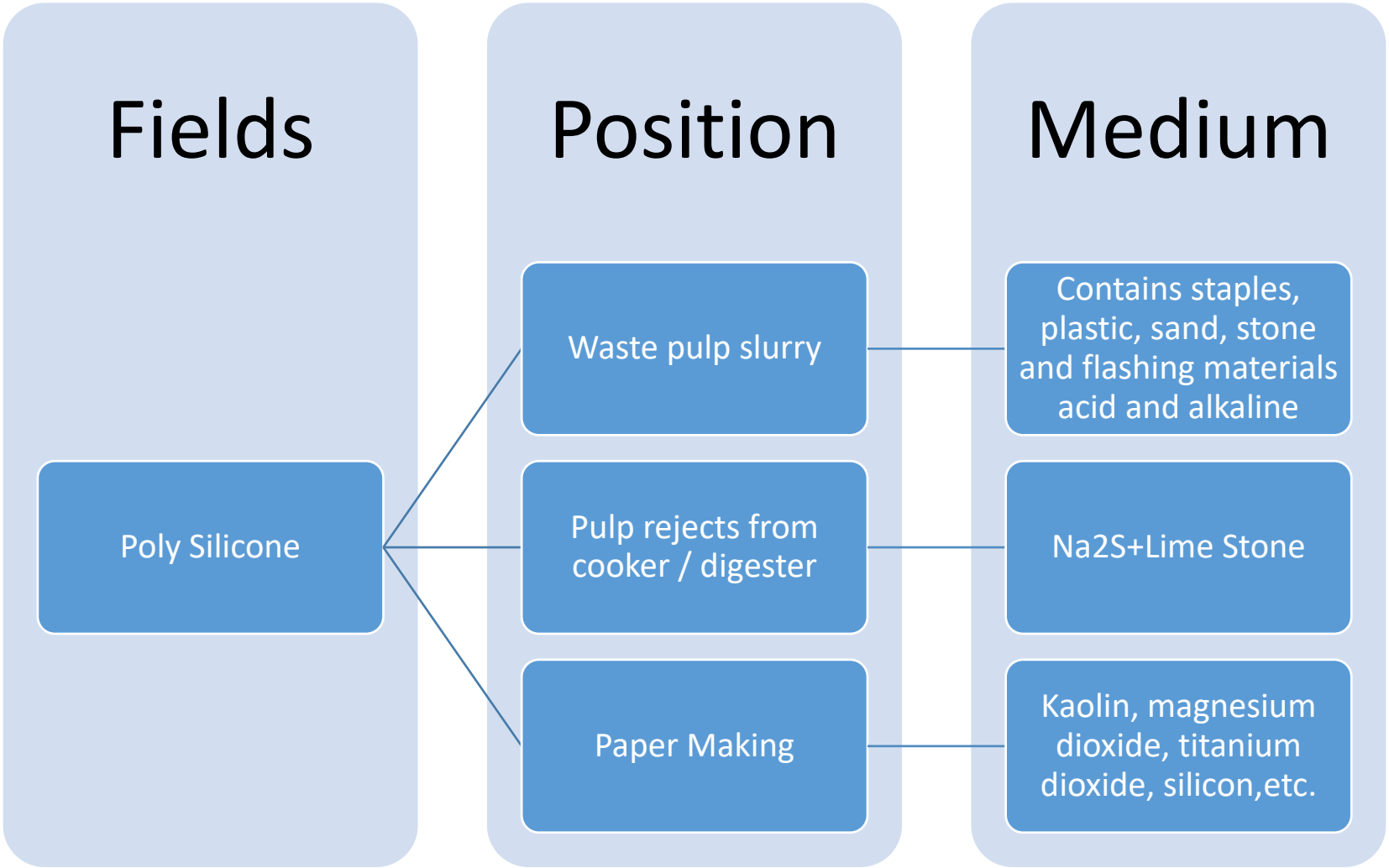
MARKETS

FIELDS

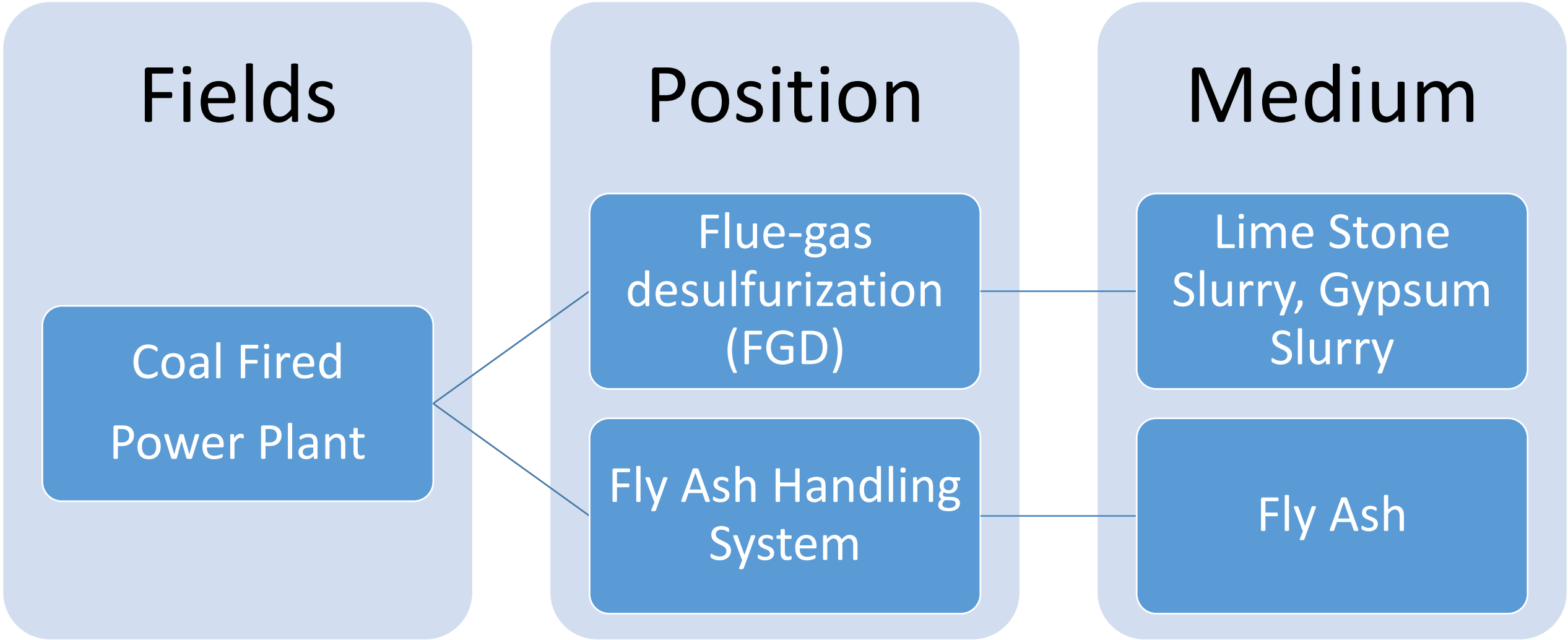


If there is any corrosive and abrasive fluids, and the service life of existing valves is too short, Ceramic Ball Valves will be a better choice .

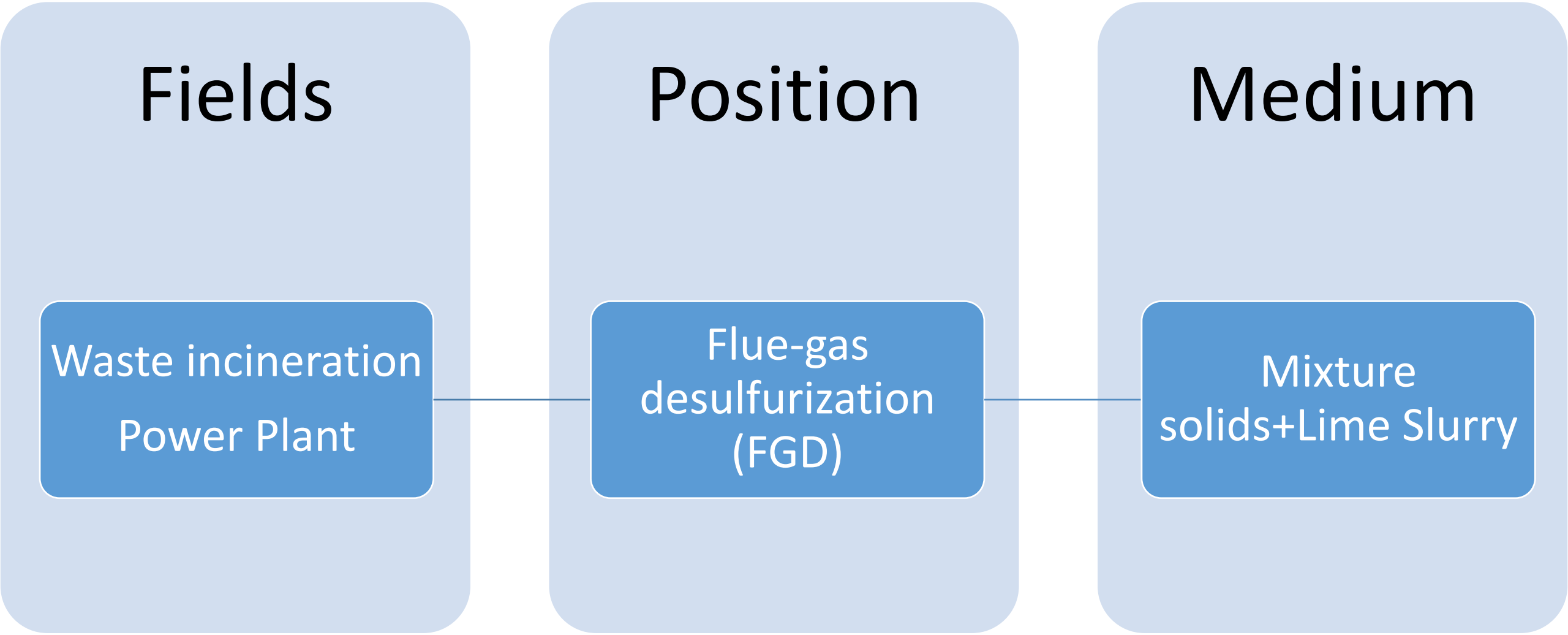
Typical Applications



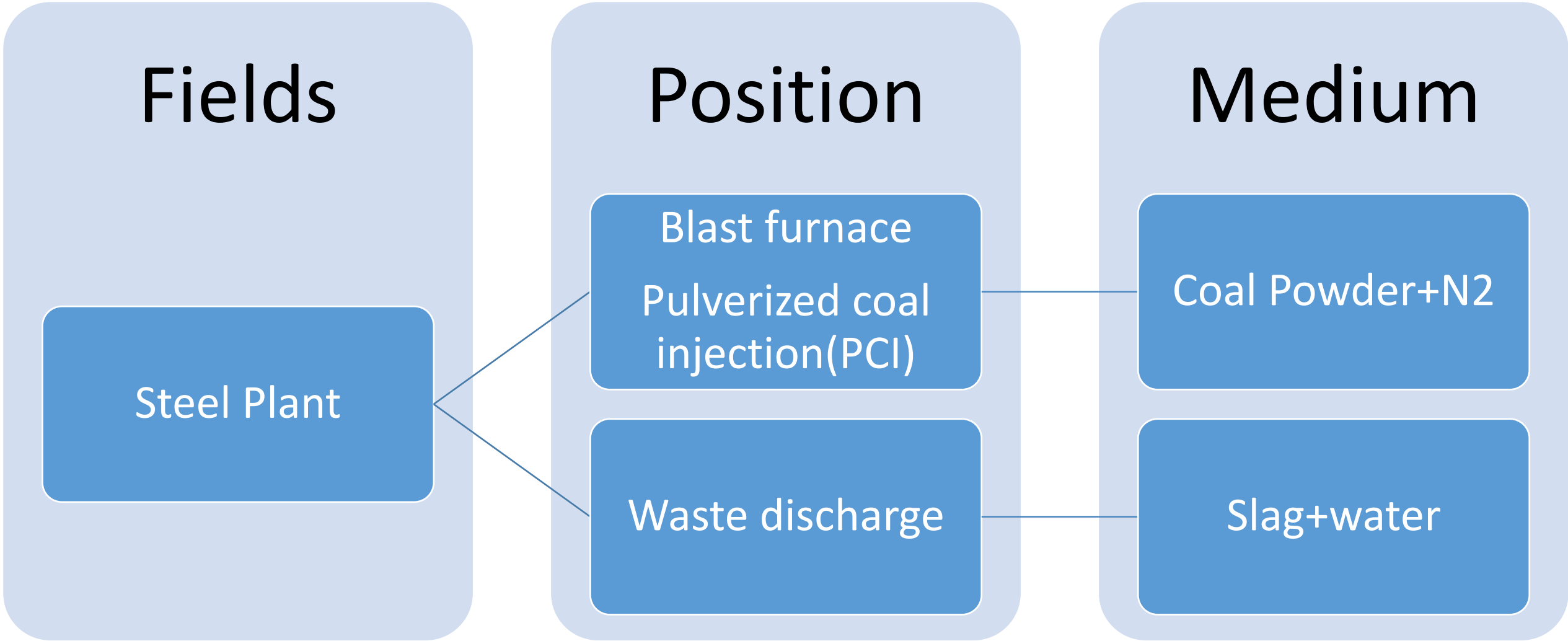
Typical Applications



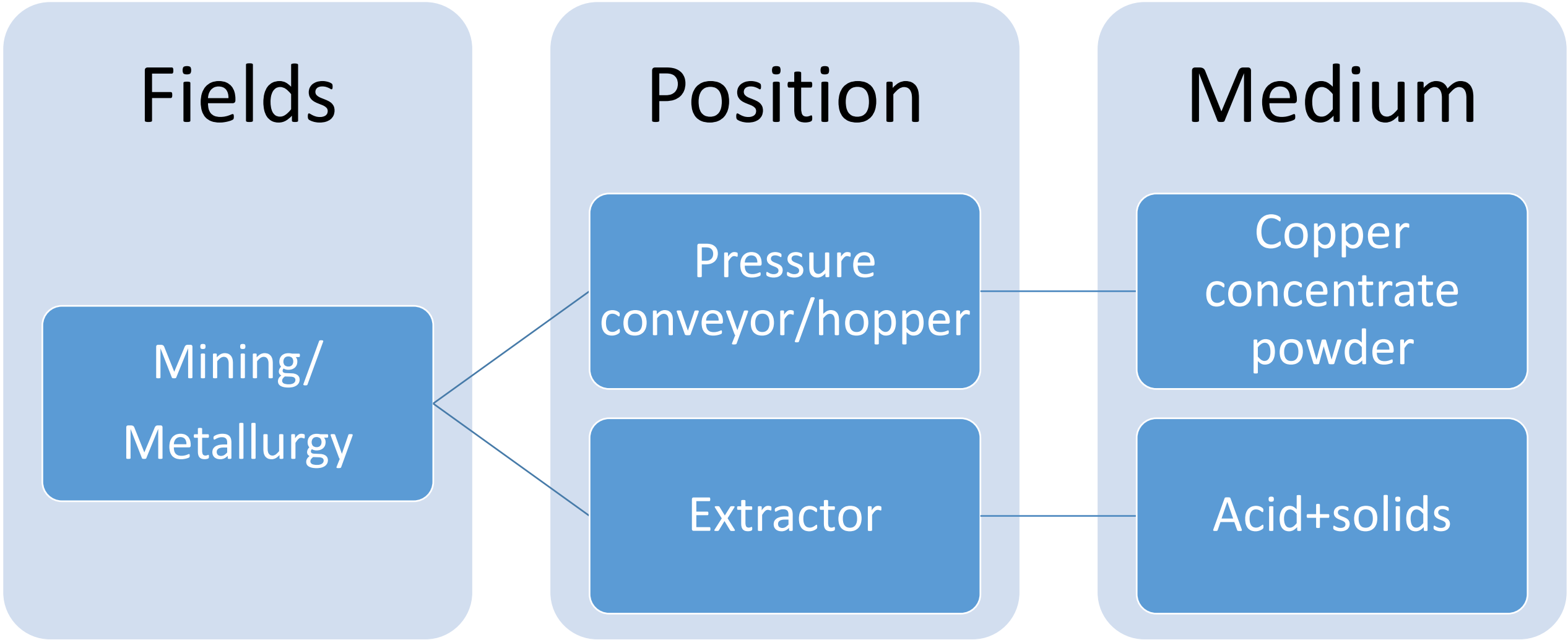
Typical Applications



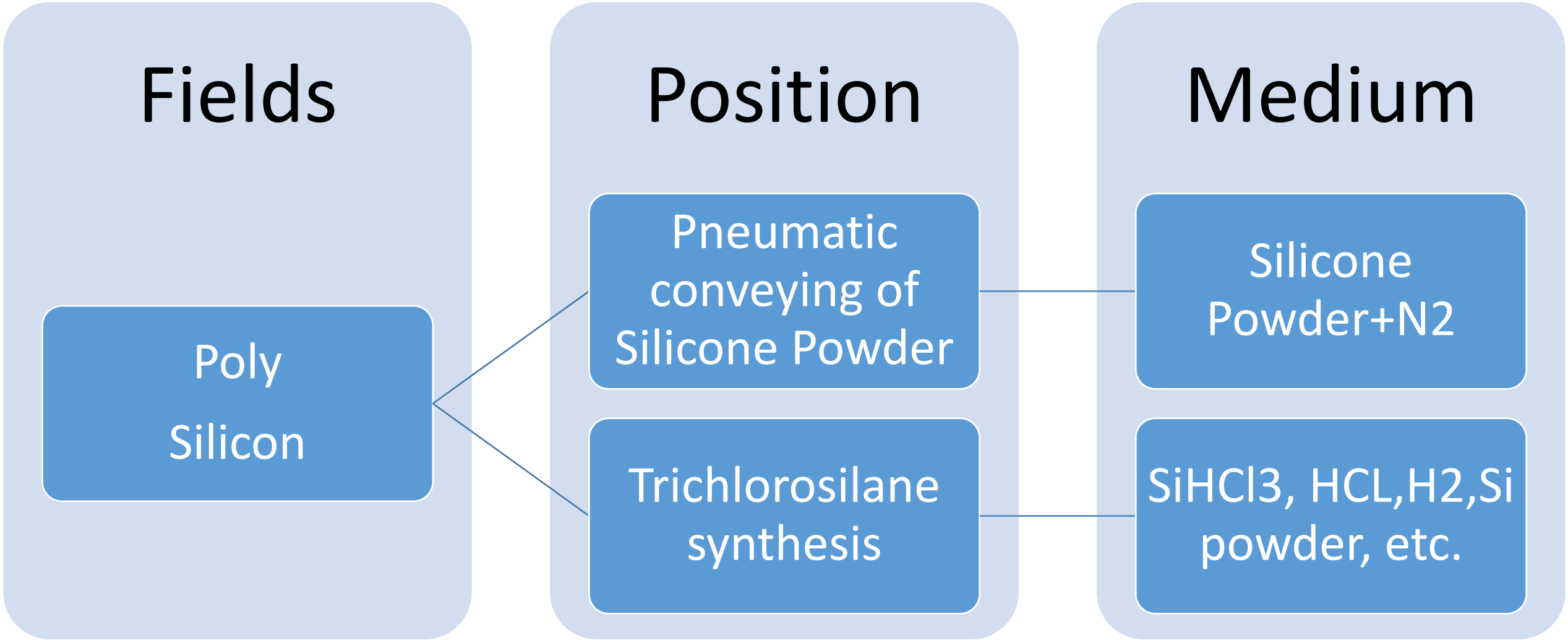
Typical Applications



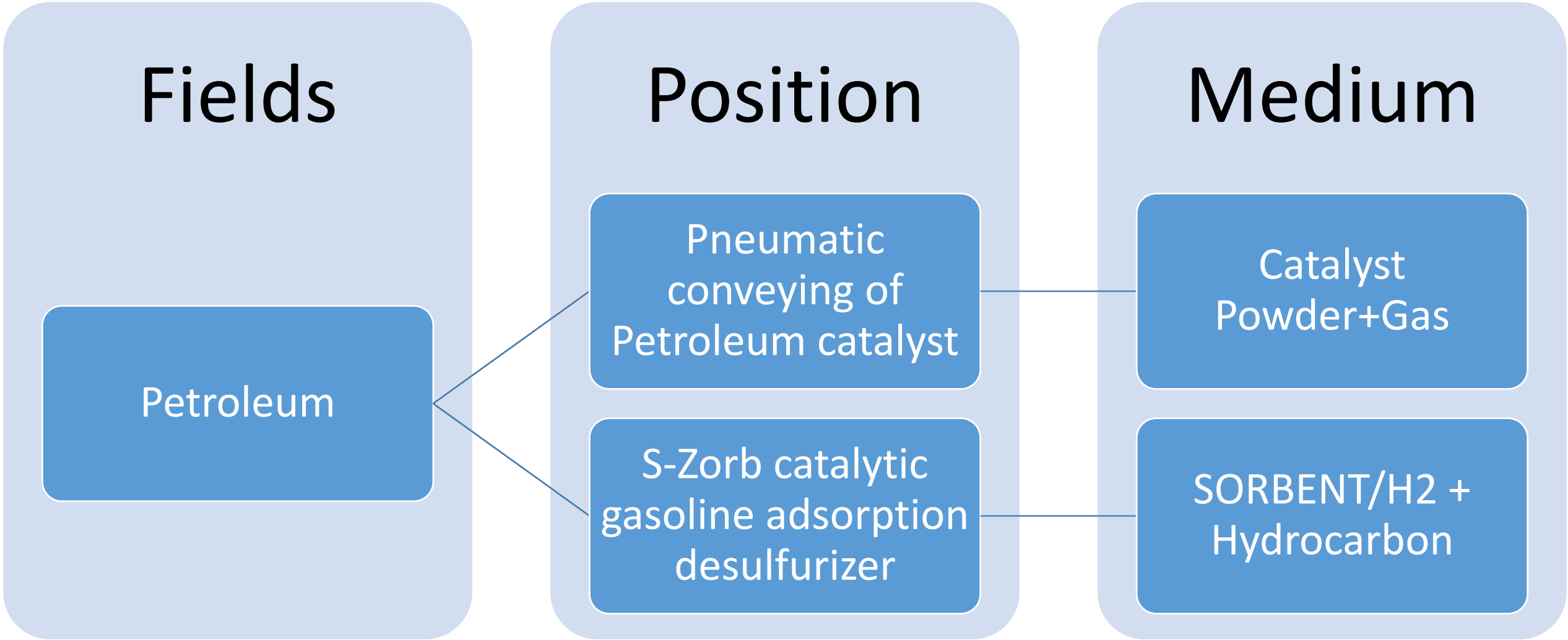
Typical Applications



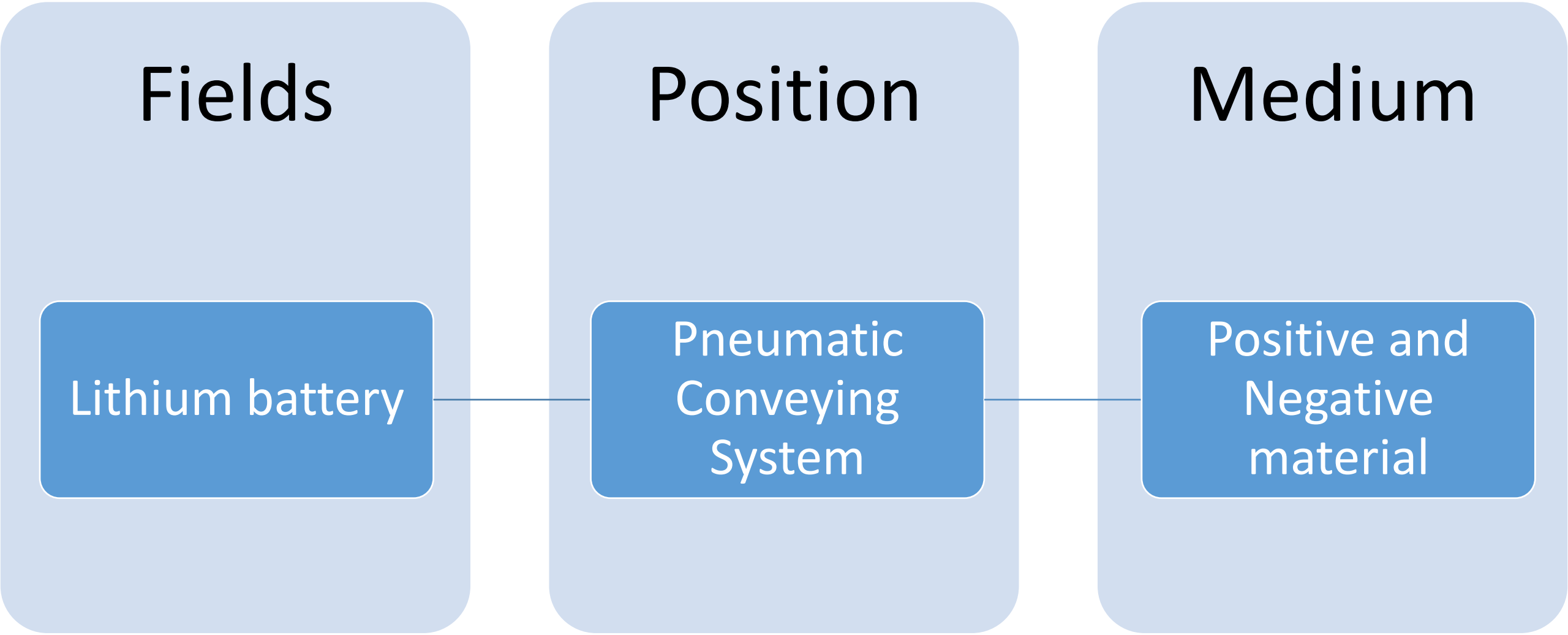
Typical Applications



Typical Applications



Typical Applications



Ceramic Ball Valves in the Field

Global Competitors

FOYO

SAMSON

CERA SYSTEM®

✓ more than ceramics

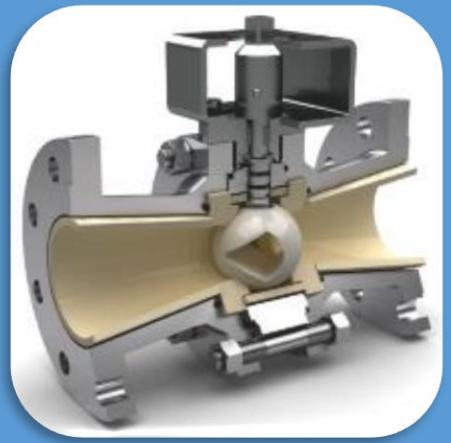
Fujikin®

metso

neles

China

Germany



Japan

Finland

Our Advantages and disadvantages

05

PROSPECTS

- Our Agents
- Main Customers/Partners

Company Business Vision

Quality Management Target

- To improve FOYO brand, and strive to create world famous mark of ceramic valves in 2020;
- Improve service quality, the products based on the 18-month warranty, to provide customers satisfaction products and services to ensure customer satisfaction by 99%;
- continuously improve the overall quality, the various management and engineering and technical staff with junior college or better would be account for 20% of the total number of employees.

Environment Management Target

- energy conservation, reduce wastage, and improve resource / energy efficiency;
- prevent pollution and achieve waste water, waste gas, solid waste, noise and other pollution discharge standards;

Occupational Health Safety Target

- to prevent fires;
- put an end to death, the eradication of serious injuries, minor injuries occur at frequencies below 3 ‰.

OUR GLOBAL AGENT

Italy
- AGECO Italia SrL

South Korea
- H A U D Y

Iran
- PETRO NAVAK

Canada
- Powertronics Energy Systems

Turkey
- Otkonsaş Inc.

India
- PROMTEK INTERNATIONAL

OUR CUSTOMERS/PARTNERS

MITSUBISHI MATERIALS

台塑企業
FORMOSA PLASTICS GROUP

OCI

LG Chem

EUROVALF

CEREL

Contact Us

ADD:No 53, Zhen Nan 5th Road, Tong’ an, Xiamen, Fujian, China, 361100

PHONE: +86-592-7015182 FAX: +86-592-7056137

EMAIL: sales@foyovalve.com

Web: www.foyovalve.com