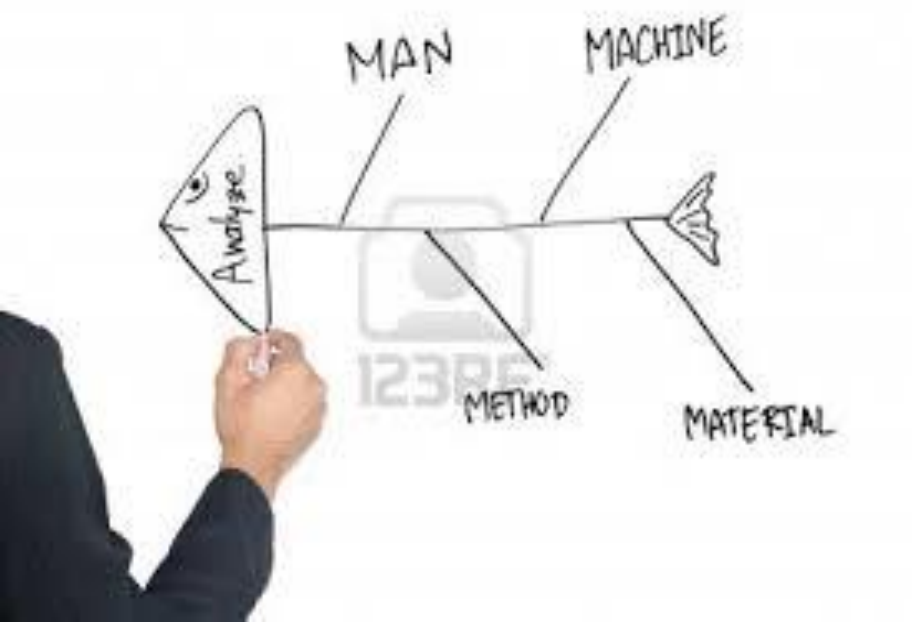

بسم الله الرحمن الرحیم

اصول سفارش وانتخاب شیرهای صنعتی

مقدمه



- همواره در بررسی علل ریشه ای خرابی شیرهای صنعتی به چهار عامل موسوم به **4M** می رسیم که بدون شک متاثر از انتخاب نامناسب انها می باشد.

- هدف از این مبحث شناسایی **پارامترهای موثر** بر انتخاب شیرهای صنعتی می باشد.

- رعایت این موارد منجر به انتخاب مناسب وافزایش طول عمر شیرهای صنعتی خواهد شد.

پارامترهای انتخاب شیرهای صنعتی

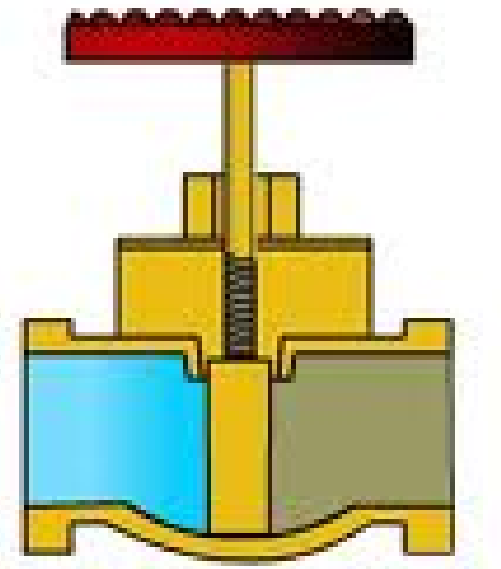
1. Application
2. Size and flow capacity
3. Pressure drop
4. Pressure & temperature rating
5. Shutoff response to leakage
6. End connection
7. Material
8. Cost

Application

- Isolating
- Throttling
- Non return valves
- Safety

Isolating valves

- Pressure drop
- Shutoff response to leakage



Isolating valves

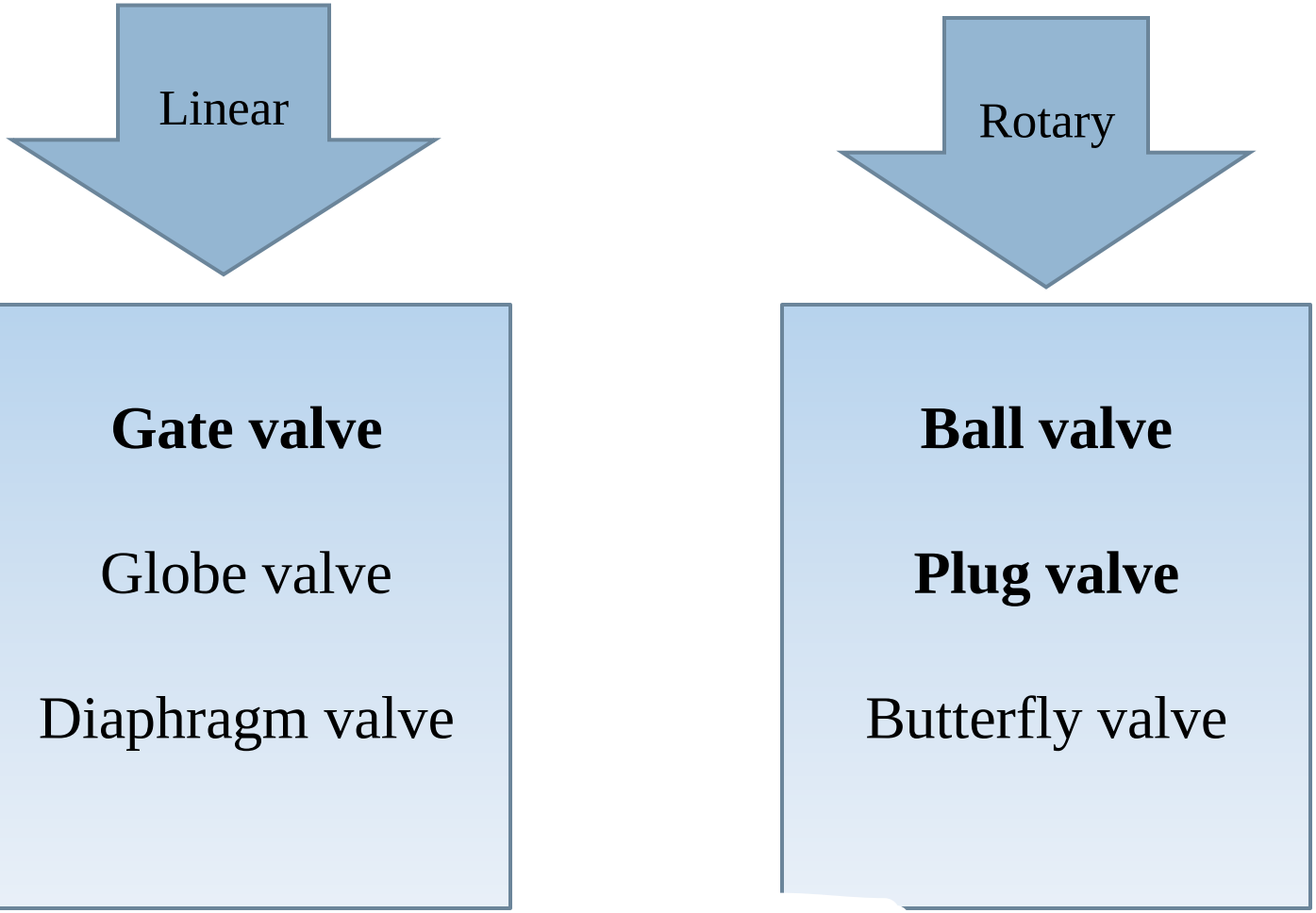
Fitting	LD	Nominal Pipe Size											
		½	¾	1	1¼	1½	2	2½-3	4	6	8-10	12-16	18-24
		K Value											
Angle Valve	55	1.48	1.38	1.27	1.21	1.16	1.05	0.99	0.94	0.83	0.77	0.72	0.66
Angle Valve	150	4.05	3.75	3.45	3.30	3.15	2.85	2.70	2.55	2.25	2.10	1.95	1.80
Ball Valve	3	0.08	0.08	0.07	0.07	0.06	0.06	0.05	0.05	0.05	0.04	0.04	0.04
Butterfly Valve							0.86	0.81	0.77	0.68	0.63	0.35	0.30
Gate Valve	8	0.22	0.20	0.18	0.18	0.15	0.15	0.14	0.14	0.12	0.11	0.10	0.10
Globe Valve	340	9.2	8.5	7.8	7.5	7.1	6.5	6.1	5.8	5.1	4.8	4.4	4.1
Plug Valve Branch Flow	90	2.43	2.25	2.07	1.98	1.89	1.71	1.62	1.53	1.35	1.26	1.17	1.08
Plug Valve Straightaway	18	0.48	0.45	0.41	0.40	0.38	0.34	0.32	0.31	0.27	0.25	0.23	0.22
Plug Valve 3-Way Thru-Flow	30	0.81	0.75	0.69	0.66	0.63	0.57	0.54	0.51	0.45	0.42	0.39	0.36

Isolating valves

Rotary

Linear

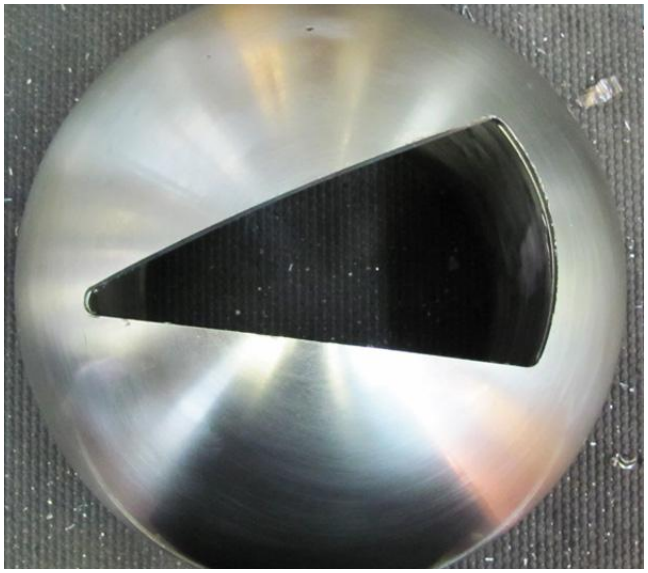
Isolating valves



Throttling valves

- Globe valve
- Butterfly valve
- Diaphragm valve
- Some design of ball valves
  - V-port
  - Semi-ball
- Some design of plug valves
  - V-port
  - Eccentric

V-port & semi ball valves



V-port & eccentric plug valves

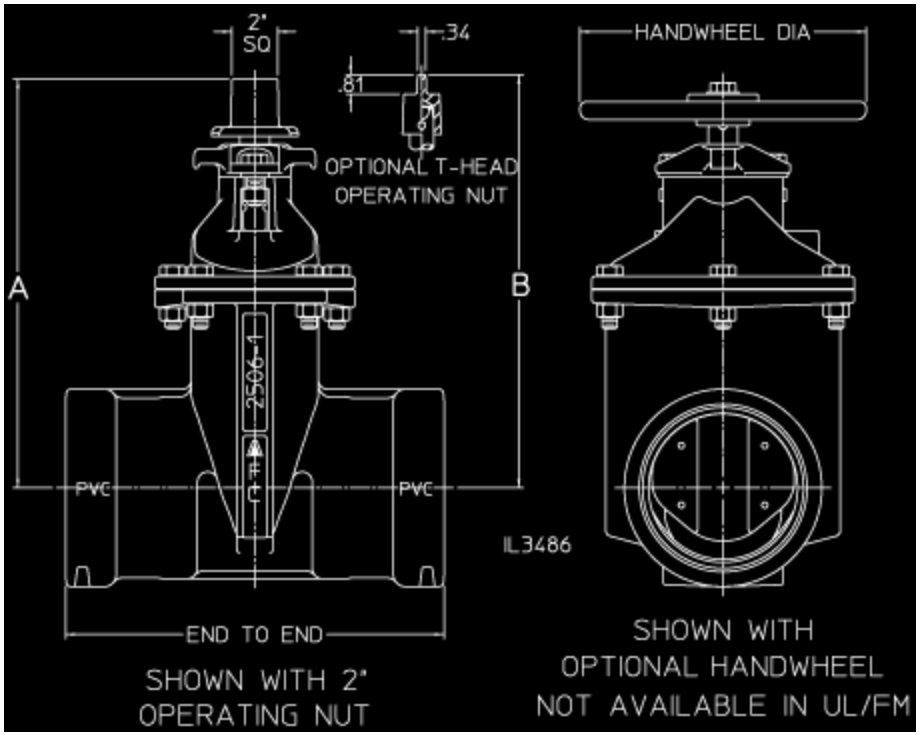
پارامترهای انتخاب شیرهای صنعتی

- ✓ Application
- **Size and flow capacity**
- Pressure drop
- Pressure & temperature rating
- Shutoff response to leakage
- End connection
- Material
- Cost

- Dimensions
- Design
- Material
- Inspection

استانداردهای ابعادی

- Face to face
- End to end
- End connection



استانداردهای ابعادی

Face to face/end to end

- **ASME B6.10**

استانداردهای ابعادی

Face to Face tolerance

- ASME B16.10
  - NPS<12” ±2mm
  - NPS≥12” ±3mm

استانداردهای ابعادی

Ball valve Face to Face

- ASME B16.10
  - Short pattern
  - Long pattern

استانداردهای ابعادی

Plug valve face to face

ASME B16.10

- Short pattern(class 150 &300)
- Regular pattern
- Venturi pattern
- Round pattern

استانداردهای ابعادی

Wafer butterfly valve face to face

- API609
- BS 5155
- ASME B16.10 table 8

استانداردهای ابعادی

wafer check valves face to face

- API 594
- ASME B16.10 table 7

استانداردهای ابعادی

- **ISA75**(control valves face to face)
- **IEC 60534-3**(control valves face to face)

استانداردهای ابعادی

End connection

- **ASME B16.5**(flange dimensions for NPS<26”)
- **ASME B16.47A/B**(flange dimensions for NPS≥26”

استانداردهای ابعادی

Flange face finishing

- **ASME B46.1**
  - 63AARH is specified for Ring Type Joints(RTJ)
  - 125-250 AARH is specified for Spiral Wound Gaskets.(RF)
  - 250-500 AARH is specified for soft gaskets(FF)

استانداردهای ابعادی

End connection

- **ASME B16.25** (butt weld)
- **ASME B16.11** (socket weld)

استانداردهای ابعادی

End connection

- **Threaded**
- NPS≤4”
- Up to class 600
- Female NPT

Size classification

Imperial

Metric

NPS VS DN

Nominal Pipe Size NPS [inches]	Nominal Diameter DN [mm]	Nominal Pipe Size NPS [inches]	Nominal Diameter DN [mm]	Nominal Pipe Size NPS [inches]	Nominal Diameter DN [mm]
1/8	6	6	150	48	1200
1/4	8	8	200	52	1300
3/8	10	10	250	56	1400
1/2	15	12	300	60	1500
3/4	20	14	350	64	1600
1	25	16	400	68	1700
1 1/4	32	18	450	72	1800
1 1/2	40	20	500	76	1900
2	50	24	600	80	2000
2 1/2	65	28	700	88	2200
3	80	32	800	96	2400
3 1/2	90	36	900	104	2600
4	100	40	1000	112	2800
4 1/2	115	42	1050	120	3000
5	125	44	1100	128	3200

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استانداردهای طراحی

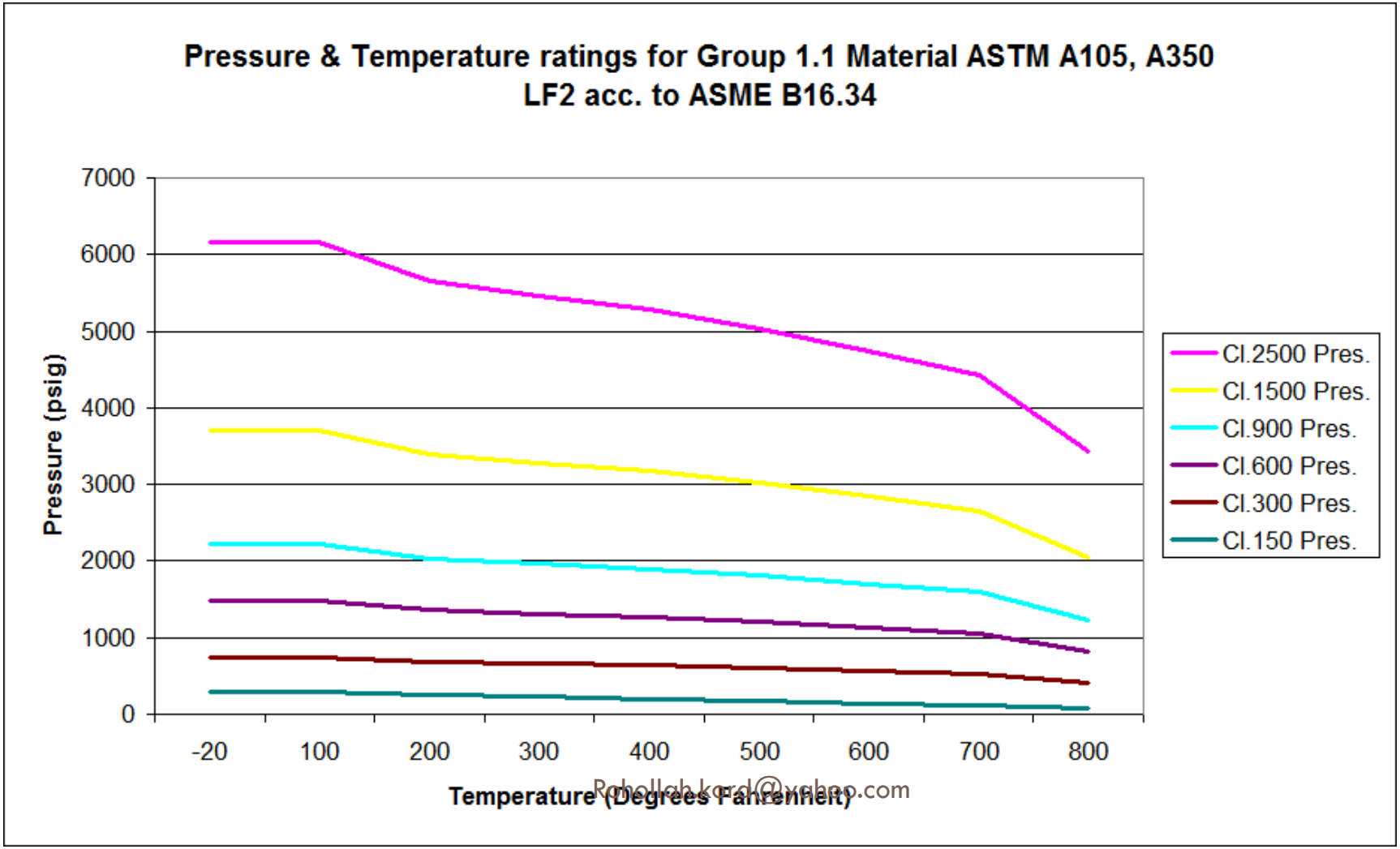
Pressure & temperature rating

- **ASME B16.34**(150,300,600,900,1500,2500)psi
- **API 602**(gate valve CL800)psi
- **ASME B16.11**(CL3000,6000,9000)psi
- **EN-1092-1(**PN20,50,100,150,250,420)bar

Pressure class equation

ANSI CLASS	ISO CLASS (PN)
150	20
300	50
600	100
900	150
1500	250
2500	420

Pressure & temperature rating



استانداردهای طراحی

- According to PMS

6.8.2 Valves shall be as per following standards

Flanges or butt welding ends steel gate valve.	API 600
Compact carbon steel gate valves.	API 602
Corrosion resistant gate valve.(class 150)	API 603
Butterfly valves lug-type and wafer type.	API 609
Rubber seated Butterfly valves.	AWWA C504
Flanged steel check valves.	BS-1868
Flanged steel globe valves.	BS-1873
Cast iron wedge and double disc gate valves.	BS-5150
Cast iron globe and globe stop and check valves.	BS-5152
Cast iron check valves.	BS-5153
Cast iron and carbon steel butterfly valves.	BS-5155
Screw down diaphragm valves.	BS-5156
Steel ball valves.	BS-5351
Forged steel gate, globe, check valves.	BS-5352

Material standards

- Body & bonnet
- Trim
- Bolting
- Gaskets
- Packing

NO	LINE CLASS	FLANGE RATING & FACING	VALVE
12	DH4	ANSI CL150 RF	BODY : A494-N-12MV TRIM : B-2
13	DK2	ANSI CL150 RF	BODY : A744 CF8 TRIM : 304L
14	DK3	ANSI CL150 RF	BODY : A744 CF8 TRIM : 304L
15	DK4	ANSI CL150 RF	BODY : A744 CF8 TRIM : 304L

Body & bonnet material

- **API600** table C1&C2
- **ASME B16.34** table1

Trim material

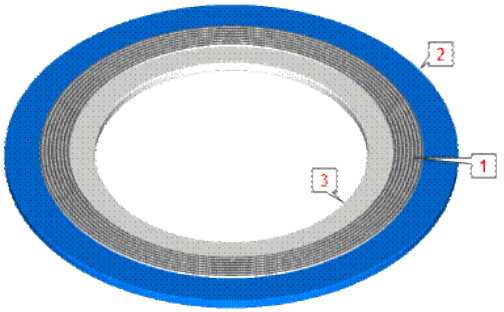
- TRIM(stem,disk,seat,…)
- Table 8 API 600

Bolting material

- A193(**Alloy-Steel and Stainless Steel Bolting)**
- A194(**Carbon and Alloy Steel Nuts)**

Gasket material

- **ASME B16.20** (Metallic Gaskets)
  - Ring-Joint,
  - Spiral-Wound,
  - Jacketed



1. Sealing Element 2. Outer Ring 3. Inner Ring

- **ASME B16.21**(Nonmetallic Flat Gasket)

Inspection

- Document check
- Visual inspection
- Workshop tests

Document check

- Data sheet
- Drawing
- Spare part list
- Inspection &test plan
- Material certificate
- Test report

Visual inspection

- MSS SP-55
- MSS SP-25
- Dimensional check
- Material check

Inspection standards

- API 598
- API 6D
- API 6A
- API 6FA
- API 6FC
- API 607
- BS 5146
- BS 6755
- MSS SP-61
- MSS SP-82
- ASME B16.34
- ISO 5208
- DIN 3230

Inspection standards

Fire safe test standards

- API std 607
- API RP 6FA
- BS 5146

Inspection standards

- ISA-75.02 (control valves capacity test procedure)
- ISA-75.19 (Hydrostatic testing of control valves)
- ANSI B16.37 (Hydrostatic testing of control valves)

- **Seat leakage**

- IEC-60534-4
- ANSI B16.104

Inspection standards

- API 527 (seat tightness of PRV)
- API 510 (pressure vessel inspection)
- API 576 (Inspection of pressure reliving devices)

باتشکر از توجه شما