

CONCEPTOS BÁSICOS



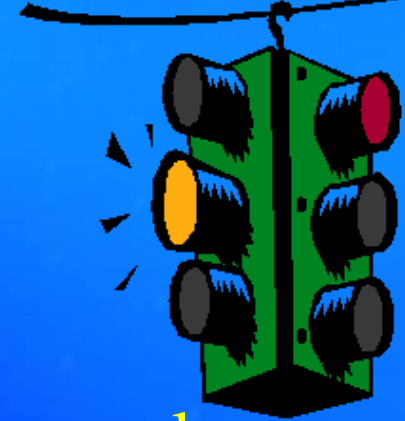
CÁLCULO Y SELECCIÓN

CONTENIDO

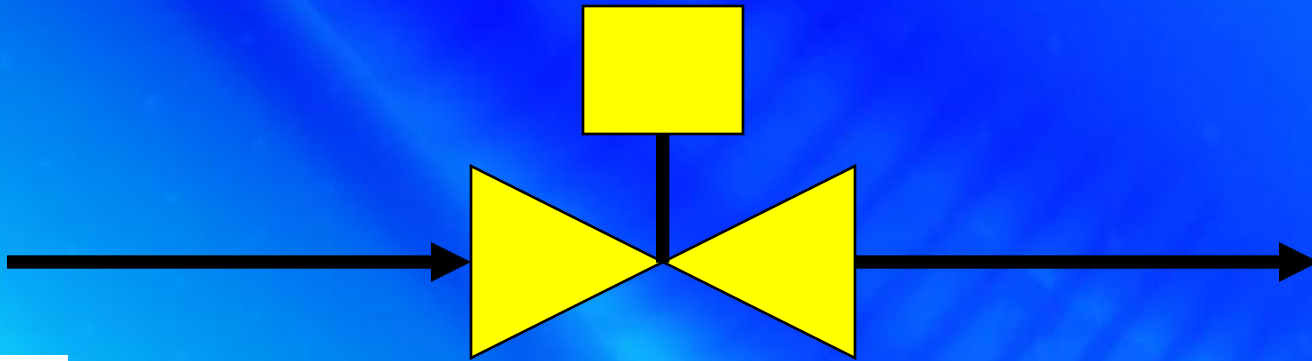
- **CONCEPTOS BÁSICOS**
- **DIMENSIONAMIENTO**
 - DIMENSION. MULTIVUELTA
 - DIMENSION. 1/4 DE VUELTA (GIRO DE 90°)
- **TIPOS DE CONTROL**

VÁLVULA

- QUE ES?



Elemento usado basicamente para el control de flujo, gases u otras sustancias

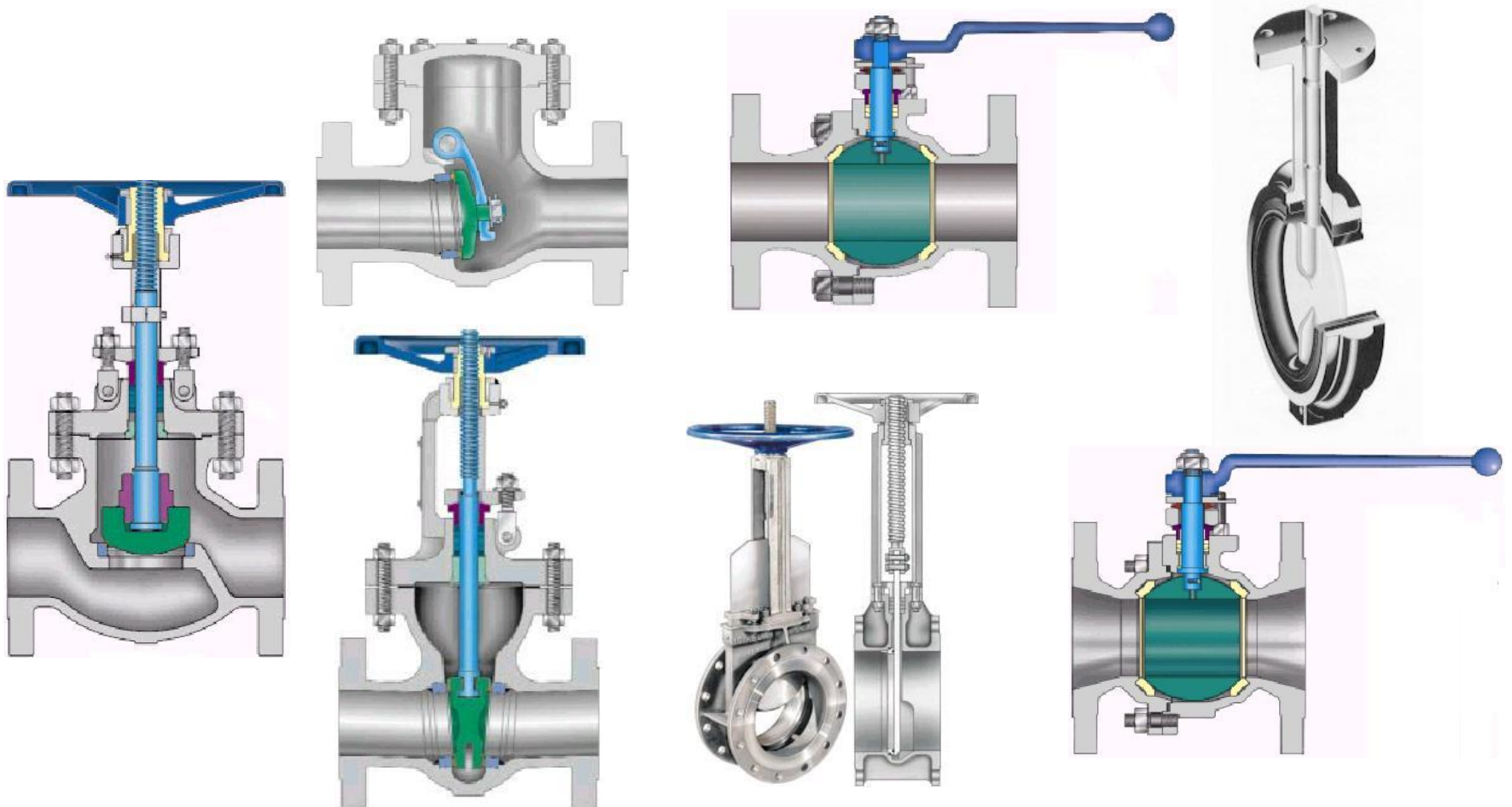


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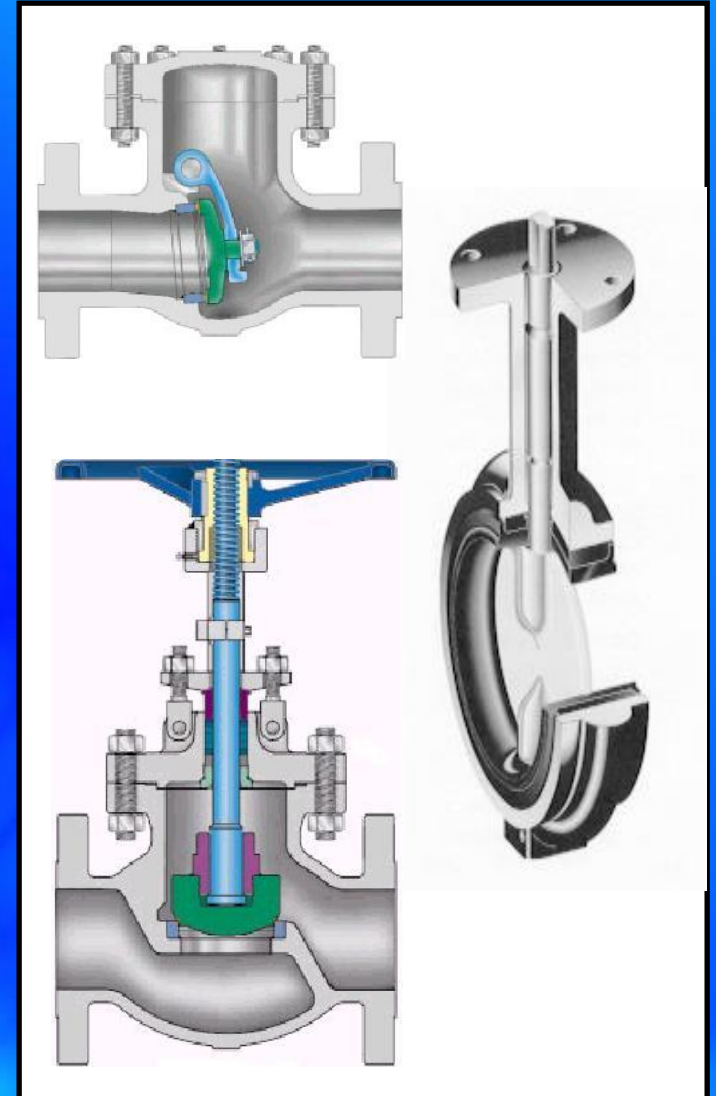
VÁLVULAS

- CUANTOS TIPOS EXISTEN?



VÁLVULAS

- **COMO SE CLASIFICAN?**
 - APLICACIONES
 - USOS
 - FUNCIONAMIENTO
 - FORMAS DE SER OPERADAS
 - MULTIVUELTAS
 - ¼ DE VUELTA (GIRO DE 90°)
 - POR CAUDAL
 - LINEAL



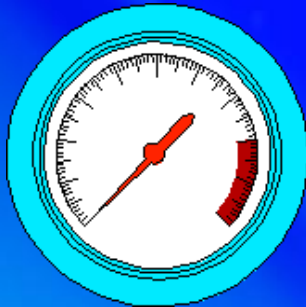
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CONCEPTOS BÁSICOS

CLASES SEGÚN NORMA ANSI

PRESIÓN



TEMPERATURA

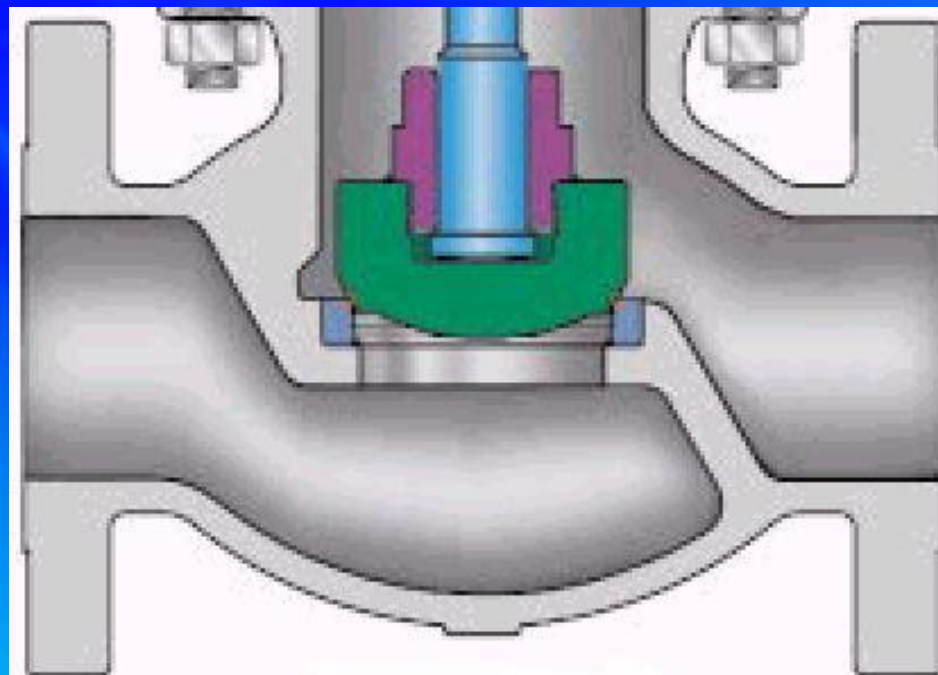
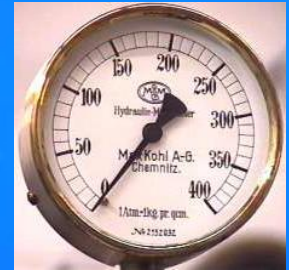


A216 Gr. WCB

TEMP. °F	WORKING PRESSURE by classes, psig						
	150	300	600	900	1500	2500	4500
100	285	740	1480	2220	3705	6170	11110
200	260	675	1350	2037	3375	5625	10120
300	230	655	1315	1975	3280	5470	9845
400	200	635	1270	1910	3170	5280	9505
500	170	600	1200	1800	2995	4990	8980
600	140	550	1100	1675	2735	4560	8210
650	125	535	1050	1600	2685	4475	8055
700	110	535	1000	1525	2665	4440	7990
750	95	505	950	1450	2520	4200	7560
800	80	410	800	1200	2060	3430	6170
850 ⁽¹⁾	65	270	550	800	1340	2230	4010
900 ⁽¹⁾	50	170	345	500	860	1430	2570
950 ⁽¹⁾	35	105	205	310	515	860	1545
1000 ⁽¹⁾	20	50	105	155	260	430	770

PRESIÓN DIFERENCIAL (ΔP)

Diferencia de presión entre la entrada de la válvula y la salida de la misma ($\Delta P = P_1 - P_2$)



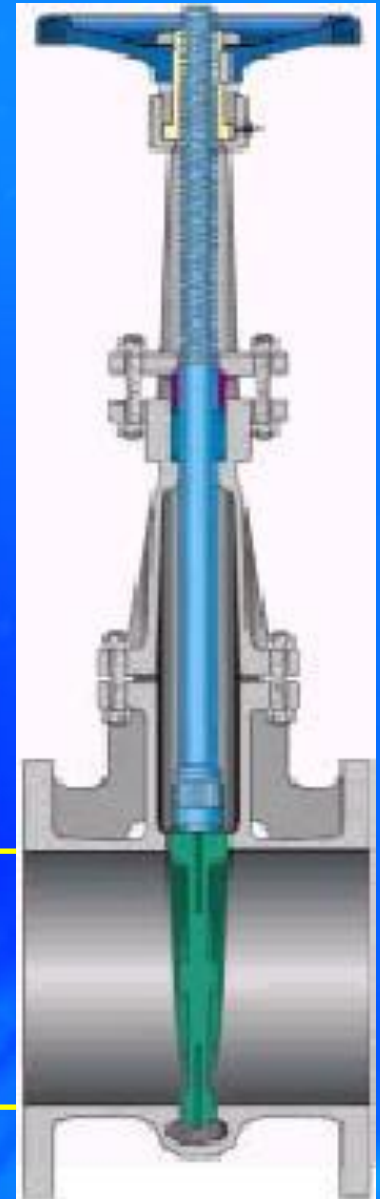
ENTRADA



SALIDA

DIÁMETRO DEL ASIEN TO

GATE VALVE DIMENSIONS CLASSES 150						
SIZE	ASME 150 (PN 20)					
	in mm	A ⁽³⁾		B ⁽¹⁾	C ⁽¹⁾	D
BW		FL				
2	8.50 216	7.00 178	15.63 397	20.38 518	2	8 203
2½ 65	9.50 241	7.50 191	16.88 429	22.14 562	2.50 64	8 203
3 80	11.12 282	8.00 203	18.56 471	24.26 616	3.00 76	10 254
4 100	12.00 305	9.00 229	22.25 565	28.32 719	4.00 102	10 254
6 150	15.88 403	10.50 267	31.19 792	38.00 965	6.00 152	14 356
8 200	16.50 419	11.50 292	38.19 970	46.13 1172	8.00 203	18 457
10 250	18.00 457	13.00 330	47.16 1198	56.28 1430	10.00 254	20 508
12	19.75 502	14.00 356	55.91 1420	66.75 1695	12	20 508
14	22.50 572	15.00 381	61.50 1562	75.00 1905	13.25	24 610
16 400	24.00 610	16.00 406	68.75 1746	85.00 2159	15.25 387	24 610
18	26.00 660	17.00 432	73.25 1861	90.00 2286	17.25	24 610



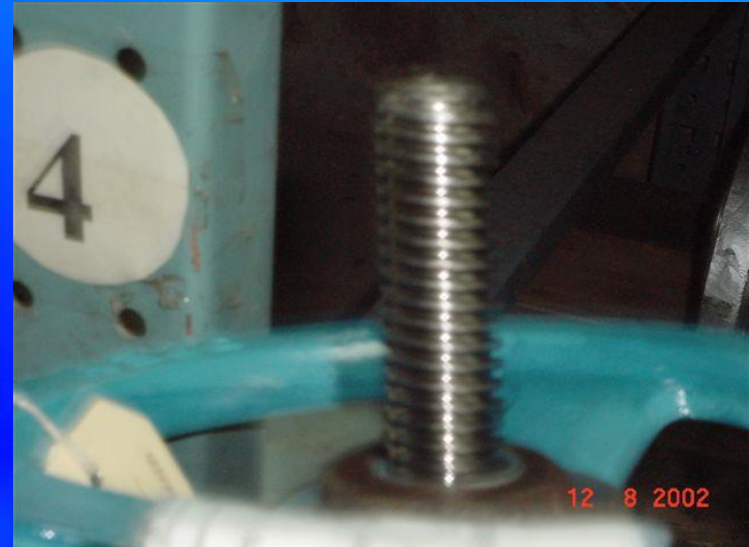
VÁSTAGO (SHAFT, STEM)



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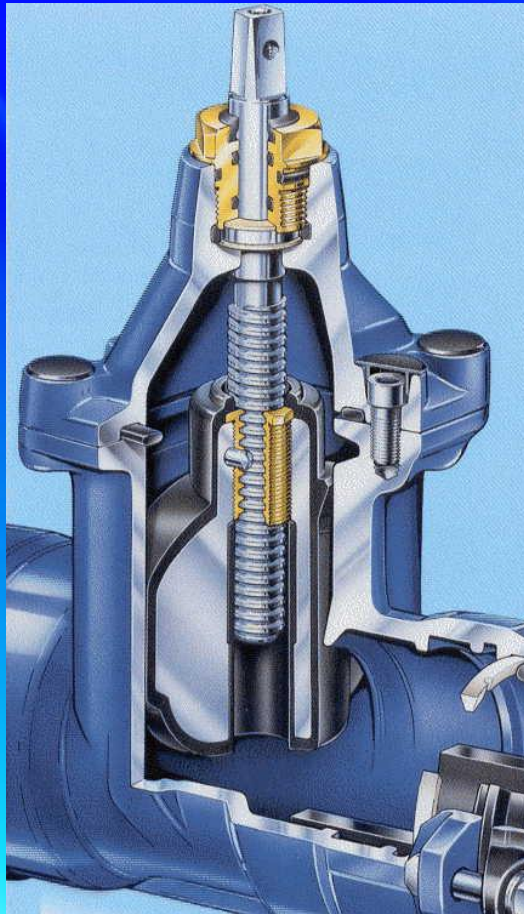
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VÁSTAGO (SHAFT, STEM)

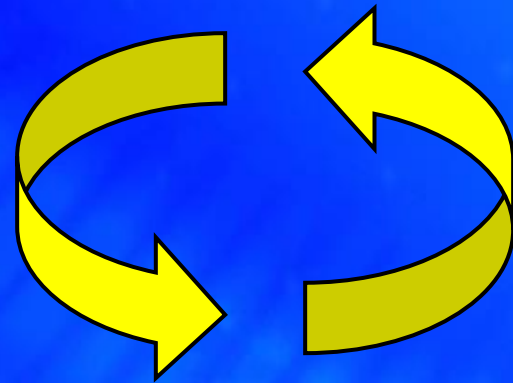


TIPOS DE VÁSTAGO (SHAFT, STEM)

- VÁSTAGO FIJO - MULTIVUELTA



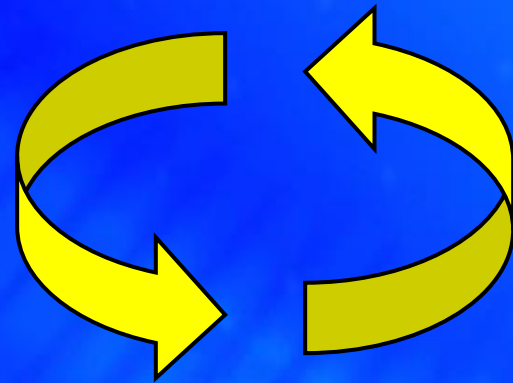
MOVIMIENTO



TIPOS DE VÁSTAGO (SHAFT, STEM)

- VÁSTAGO FIJO - MULTIVUELTA
CAJA DE ENGRANAJE

MOVIMIENTO

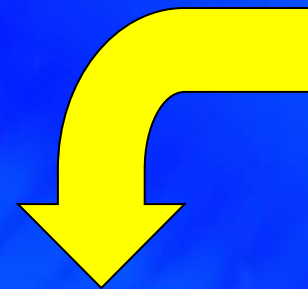


TIPOS DE VÁSTAGO (SHAFT, STEM)

- VÁSTAGO FIJO - 1/4 DE VUELTA



MOVIMIENTO

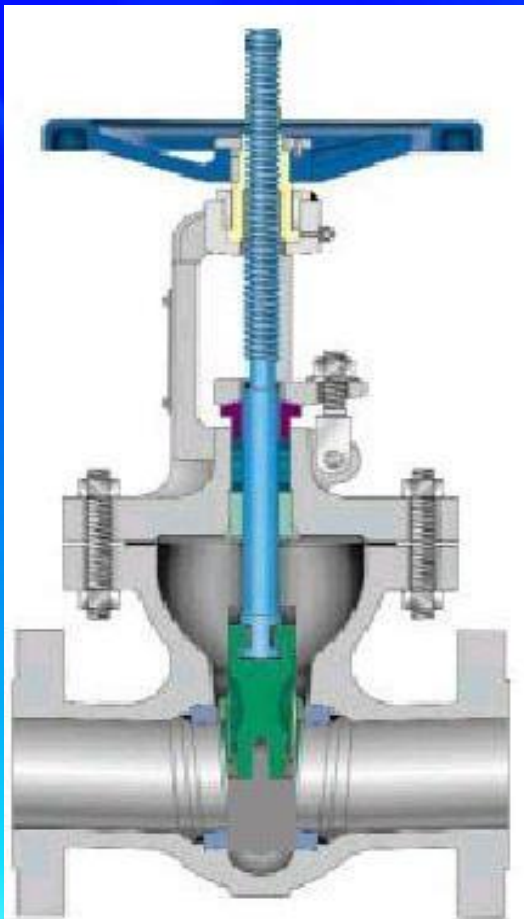


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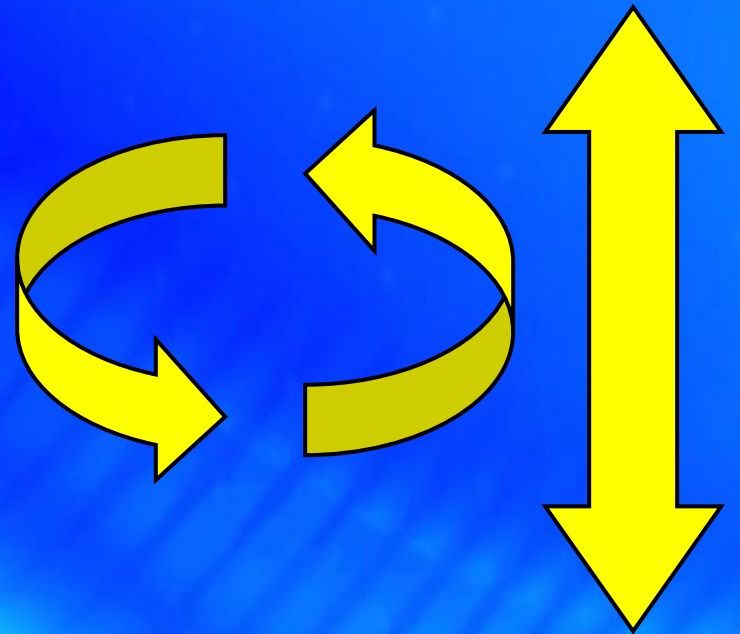
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TIPOS DE VÁSTAGO (SHAFT, STEM)

- VÁSTAGO ASCENDENTE



MOVIMIENTO



TIPOS DE VÁSTAGO (SHAFT, STEM)

- VÁSTAGO ASCENDENTE



MOVIMIENTO

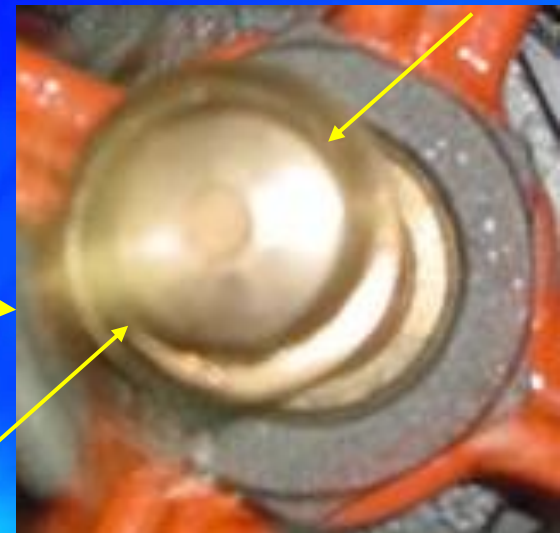
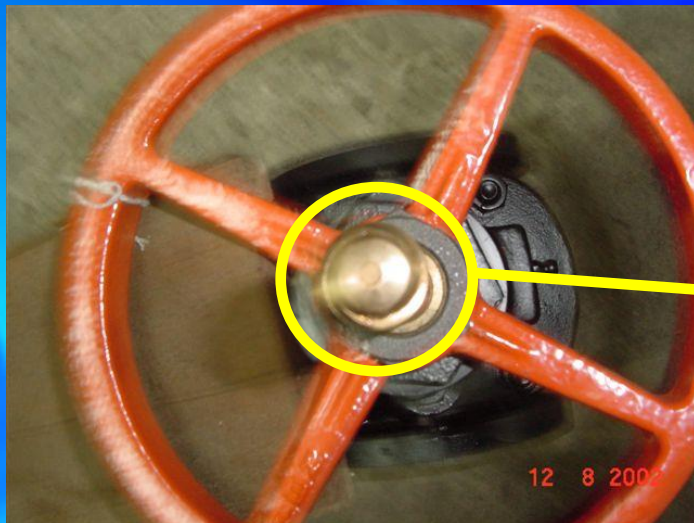
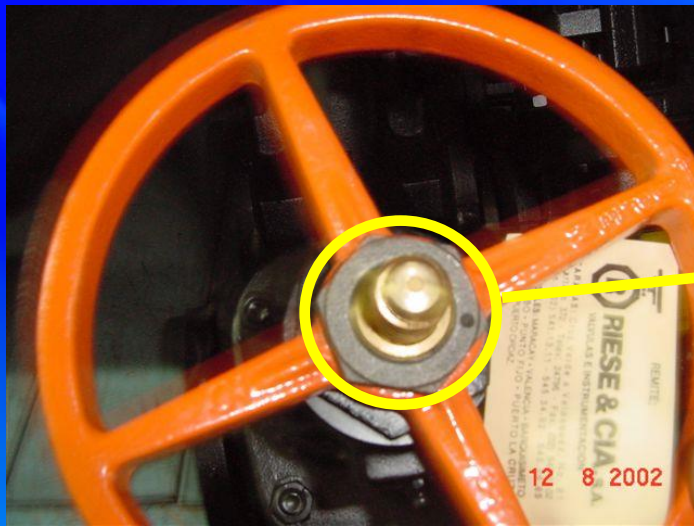


NÚMERO DE HILOS (THREAD)

Cantidad de ranuras que se visualizan desde la parte superior del vástago (Stem)

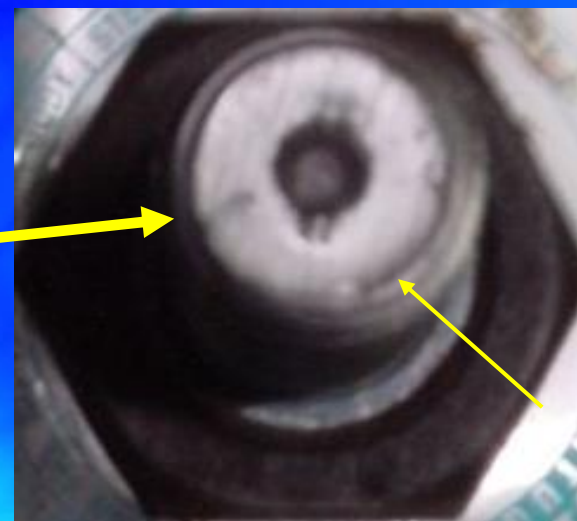
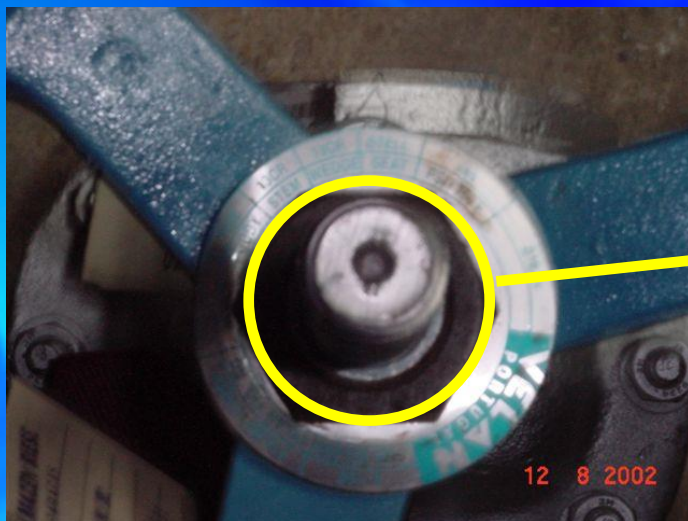
- UN HILO (1 Thread)
- DOS HILOS (2 Thread)

DOS (2) HILOS (2 THREAD)

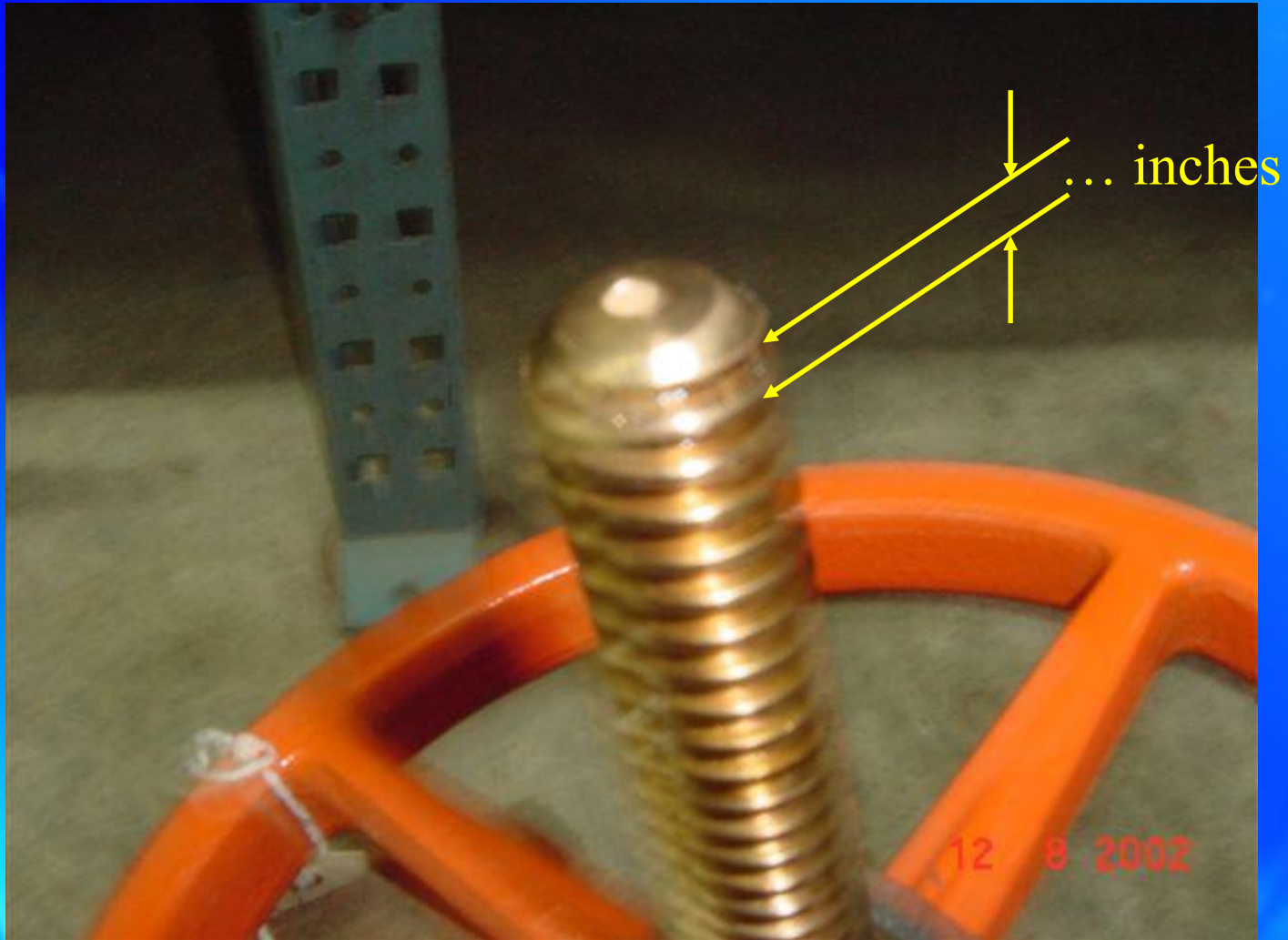


CONCEPTOS BÁSICOS

UN (1) HILO (1 THREAD)

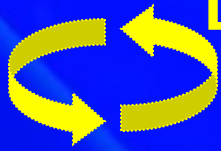


PASO (PITCH)

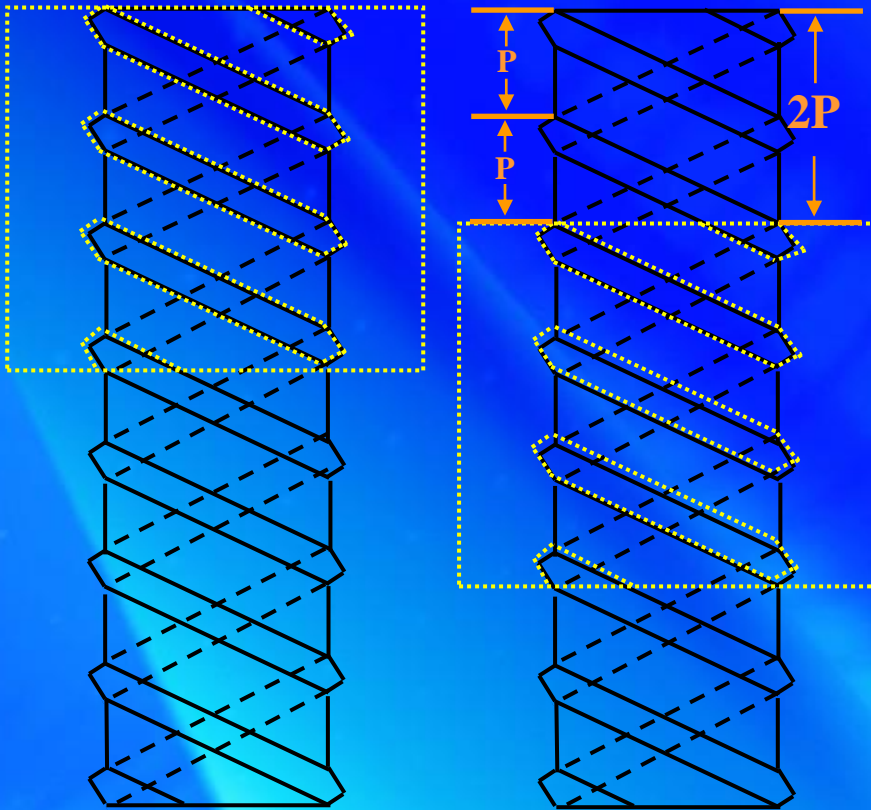


AVANCE (LEAD)

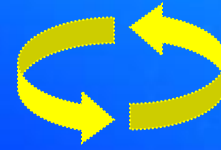
DOS HILOS



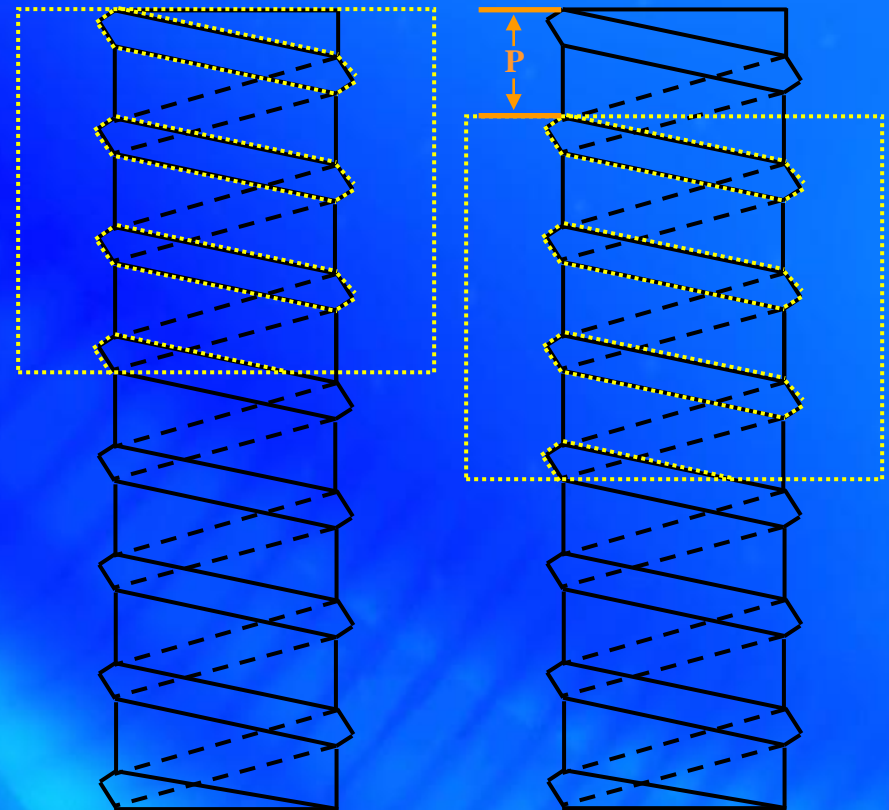
LEAD = $2 \times P$



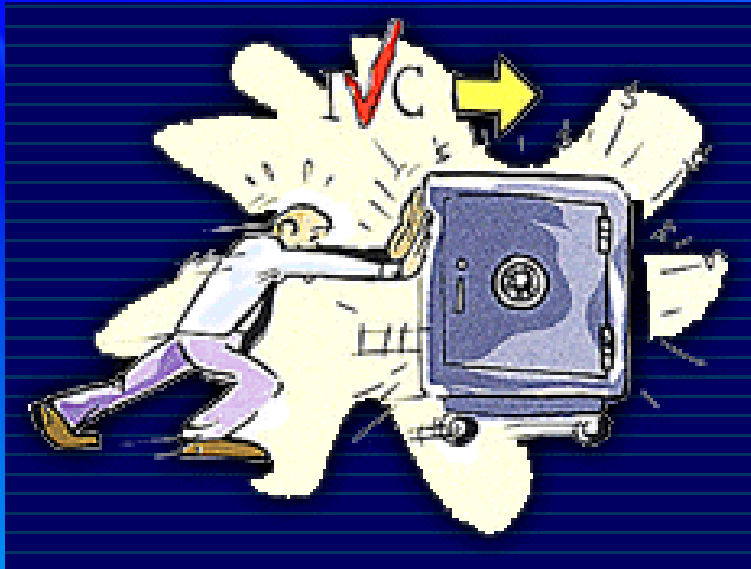
UN HILO



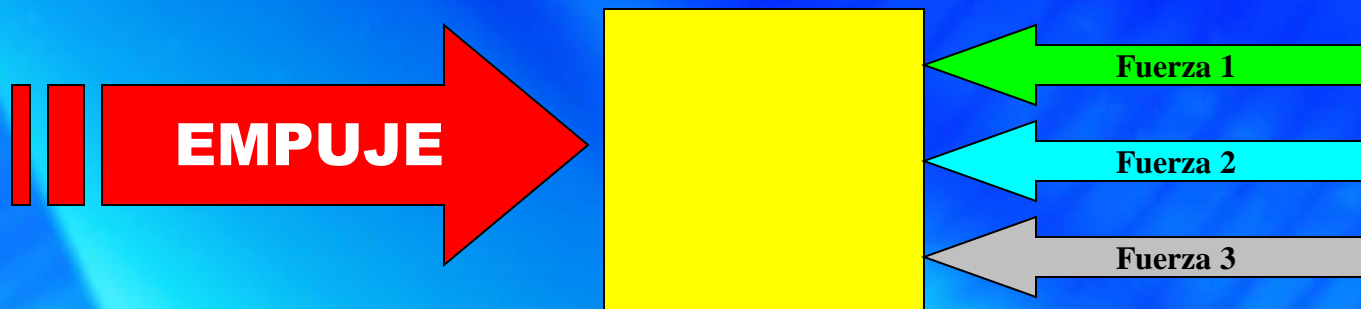
LEAD = P



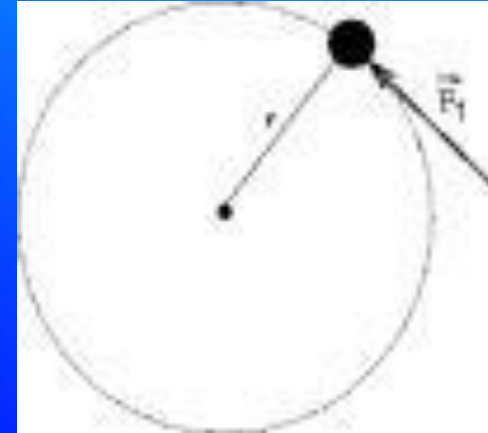
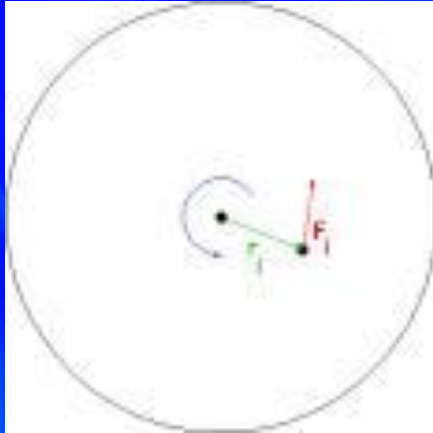
EMPUJE (THRUST)



FUERZA (LBS)



TORQUE (FUERZA x BRAZO)



TORQUE = FUERZA x BRAZO

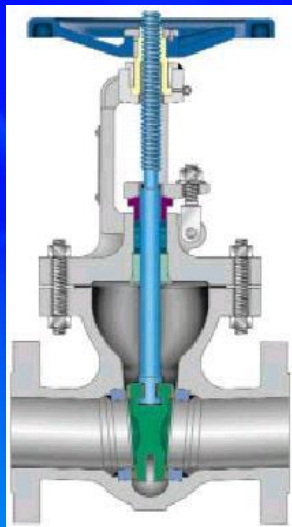
CONSIDERACIONES

SI EL TORQUE ES CONSTANTE

A MAYOR DISTANCIA \longleftrightarrow ES NECESARIO MENOS FUERZA

COMPORTAMIENTO DE LAS VÁLVULAS MULTIVUELTAS (TORQUE)

- Válvula Compuerta



- Válvula Cuchilla



- Válvula Esclusa



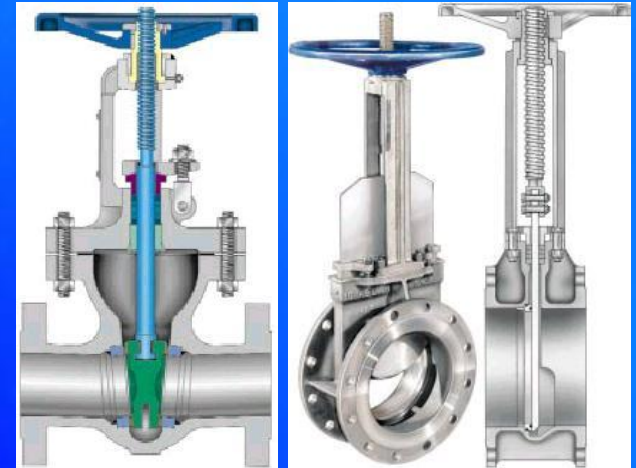
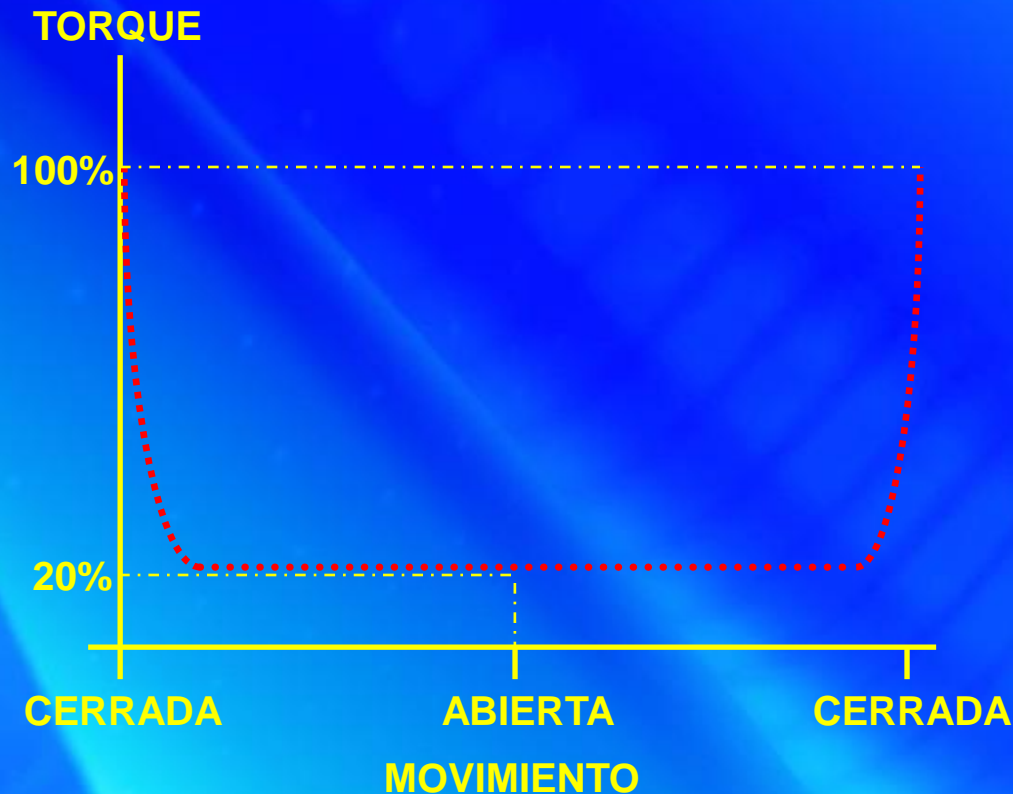
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COMPORTAMIENTO DE LAS VÁLVULAS MULTIVUELTAS (TORQUE)

- Válvulas Multivueeltas

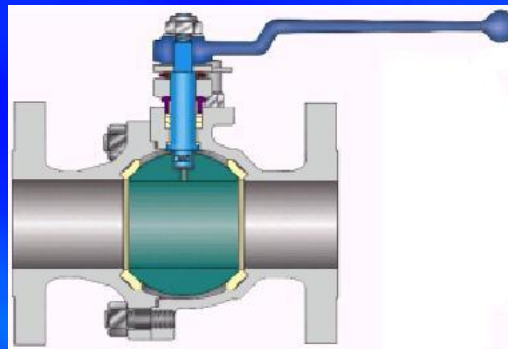


COMPORTAMIENTO DE LAS VÁLVULAS 1/4 DE VUELTA (TORQUE)

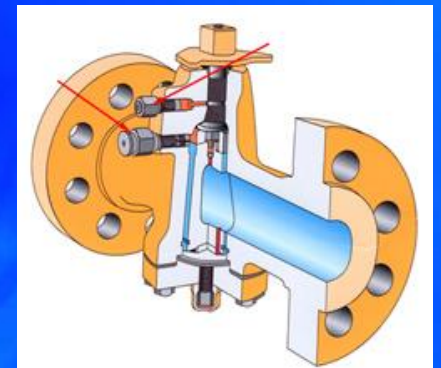
- Vávula Mariposa



- Vávula Bola

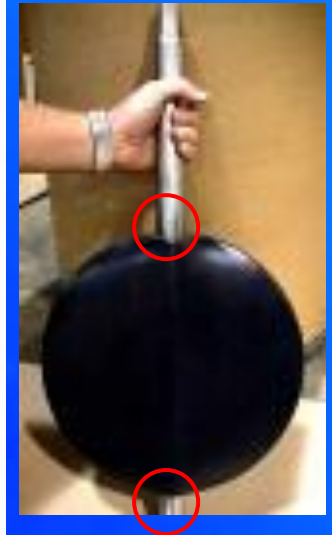
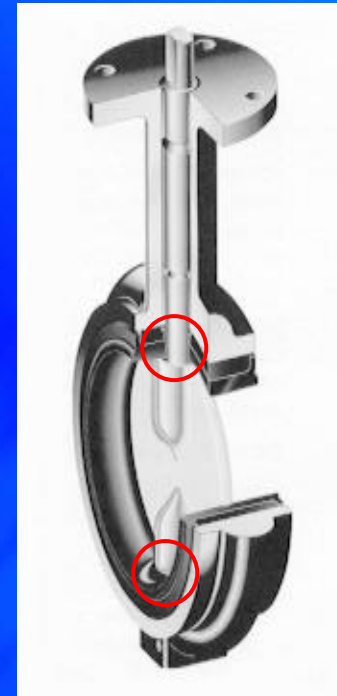
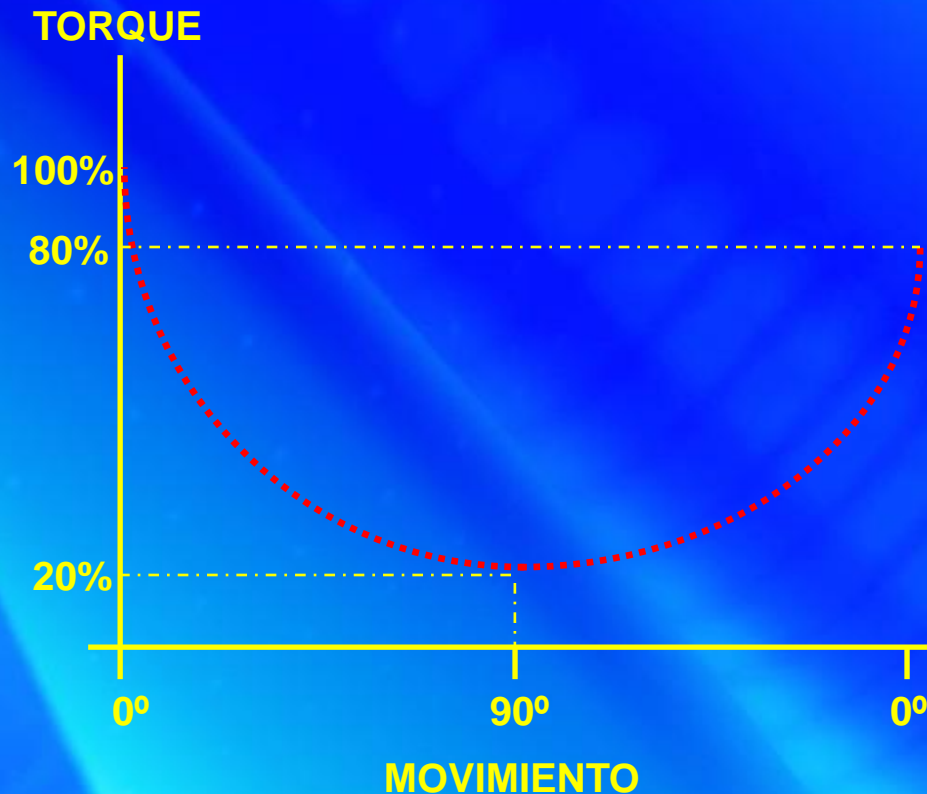


- Vávula Tapon



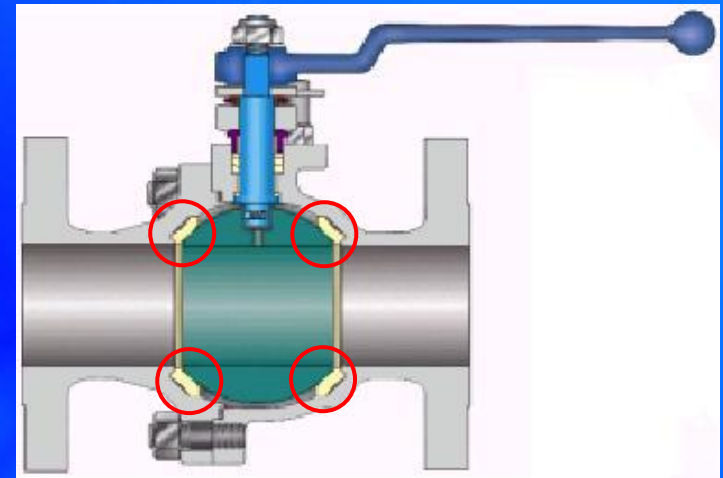
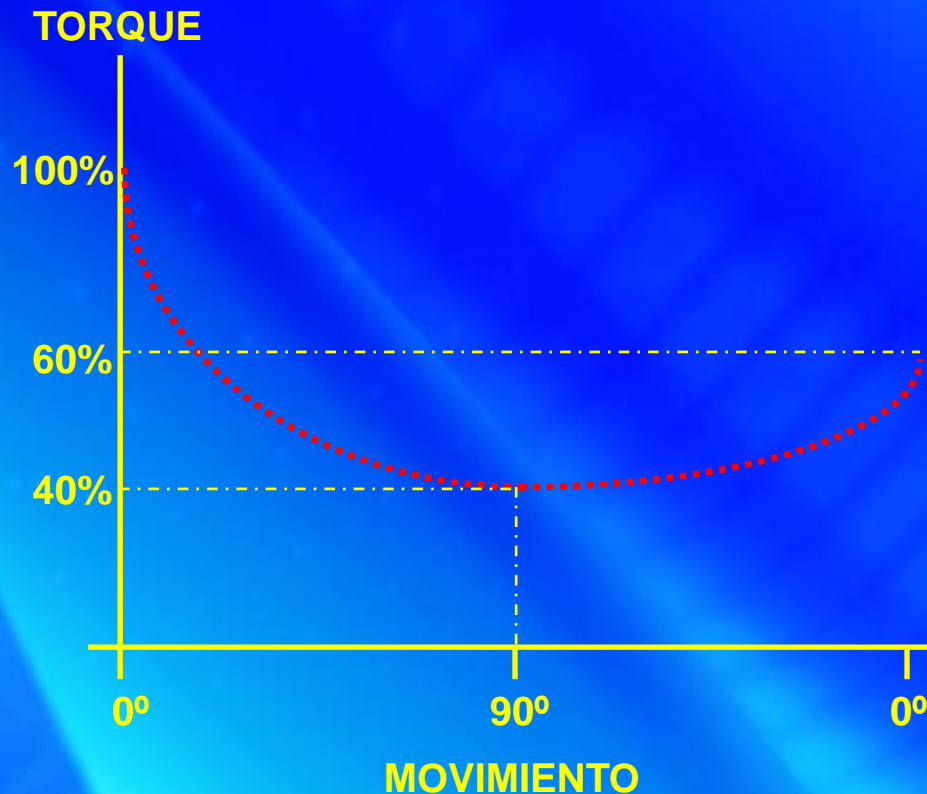
COMPORTAMIENTO DE LAS VÁLVULAS 1/4 DE VUELTA (TORQUE)

- Vávula Mariposa (Butterfly Valve)



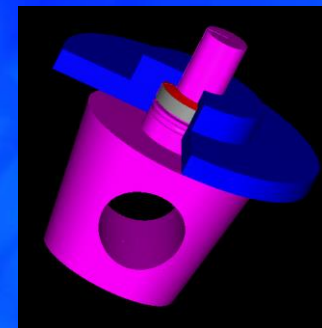
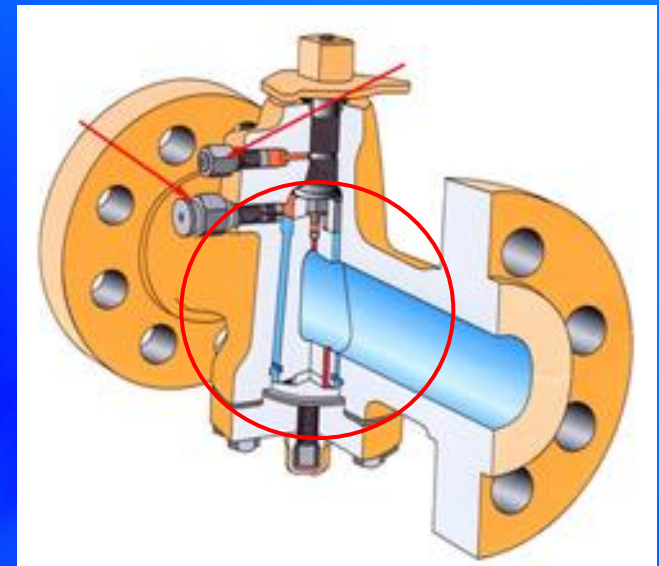
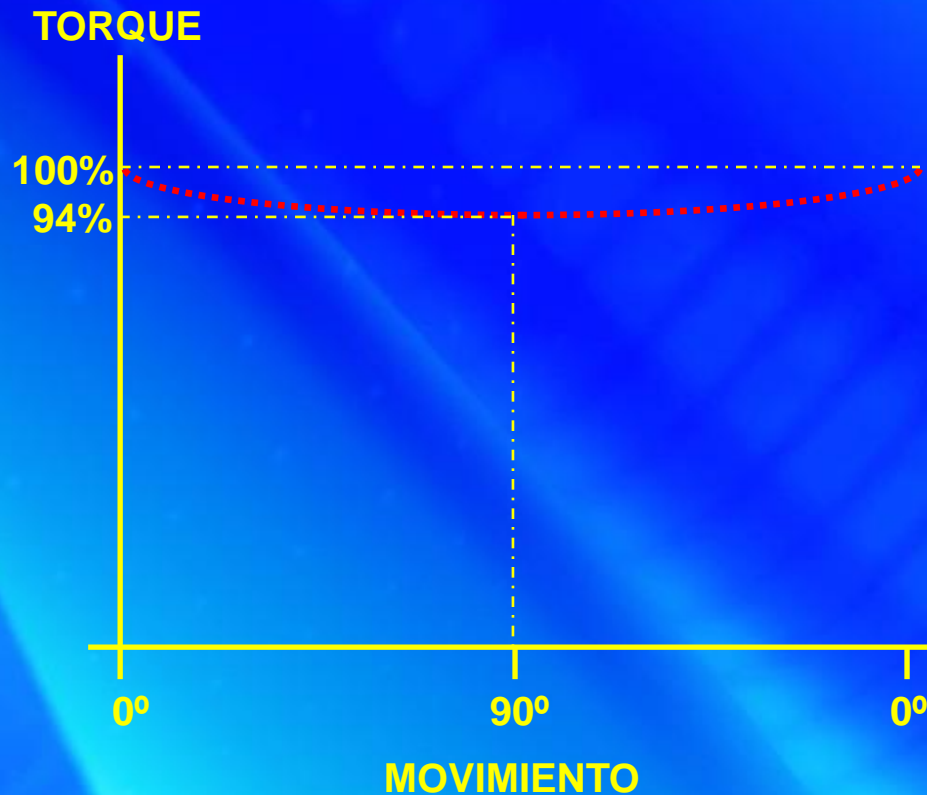
COMPORTAMIENTO DE LAS VÁLVULAS 1/4 DE VUELTA (TORQUE)

- Vávula Bola (Ball Valve)



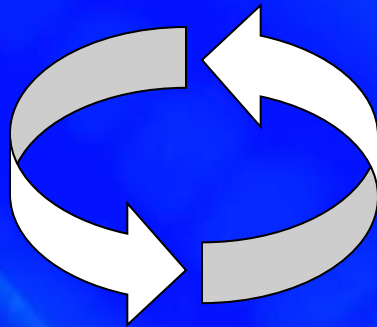
COMPORTAMIENTO DE LAS VÁLVULAS 1/4 DE VUELTA (TORQUE)

- Vávula Tapon (Plug Valve)



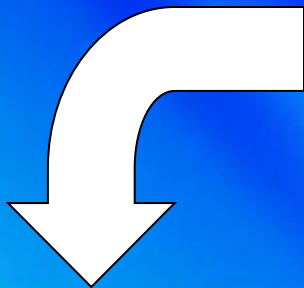
TIPOS DE DIMENSIONAMIENTO

- **MULTIVUELTAS**



“N” GIROS DE 360°

- **¼ DE VUELTA (GIRO DE 90°)**



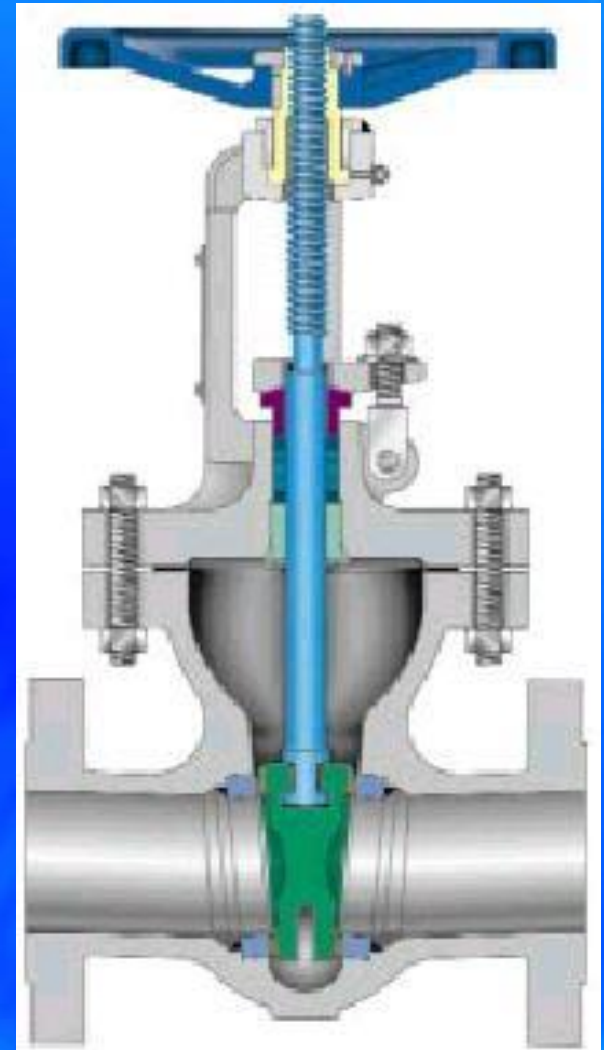
UN GIRO DE 90°

MULTIVUELTAS

- **Seleccionar la válvula.**
- **Obtener Datos de la Válvula.**
- **Obtener Datos del Proceso.**
- **Realizar Cálculos de:**
 - **Empuje.**
 - **Torque.**
 - **Velocidad.**
- **Seleccionar Actuador EIM por Catalogo.**

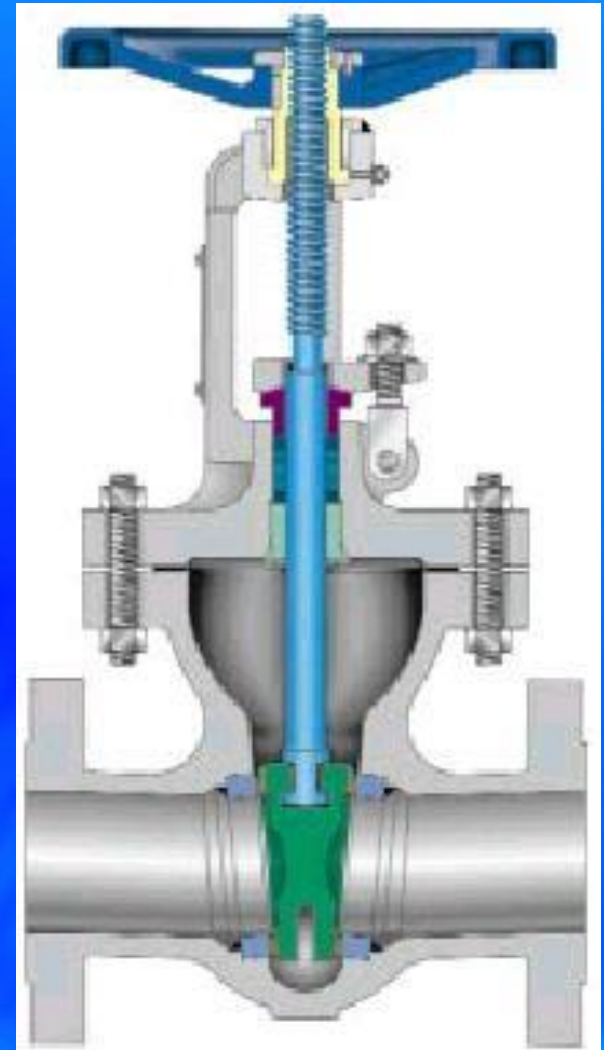
DATOS DE LA VÁLVULA

- Fabricante = VELAN
- Tipo = Compuerta
- Tamaño = 24 in
- Diametro Asiento = 23,25 in
- Clase = 150
- Vástago Ascendente
- Diametro Vástago = 2,25 in
- Número de Hilos = 2
- Paso (Pitch) = 0,33 in
- Avance (Lead) = 0,66 in



DATOS DEL PROCESO

- $\Delta P = 150 \text{ psi}$
- **Fluido = Gas**
- **Temperatura = 100°F**
- **Tiempo de uso de la Válvula = 4-6 años de uso**
- **Mantenimiento = 1 vez por año
Cada Parada de Planta**
- **Frecuencia de Operación = Promedio una (1) vez al día**



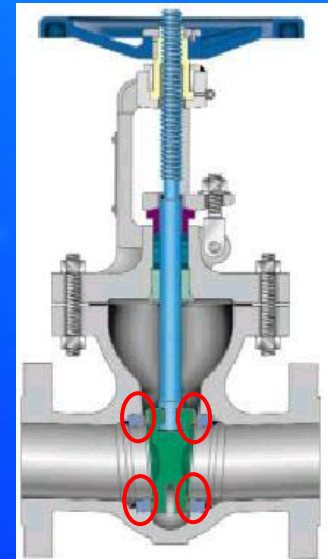
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ASIGNACIÓN DE PARÁMETROS

1.

VALVE FACTOR (SEAT FACTOR)	VALOR
PARALLET SEAT	0,2
DOUBLE DISC	0,2
FLEXIBLE/WEDGE	0,3
SPLIT/WEDGE	0,3
SLUICE GATE	0,3
SOLID DISC	0,3
NON-RISING STEM	0,5
GLOBE&ANGLE	1,1



2.

FACTOR DE SEGURIDAD = 1,2

CÁLCULO

- EMPUJE PICO (P/O THRUST)
- TORQUE PICO (P/O TORQUE)
- TORQUE EN FUNCIONAMIENTO (RUN TORQUE)
- VELOCIDAD DE SALIDA (RPM)

EMPUJE PICO (PULL OUT THRUST)

$$\text{P/O Thrust} = \text{Valve Seat Force} + \text{Packing Load} + \text{Stem Piston Factor}$$

- **Valve Seat Force:**

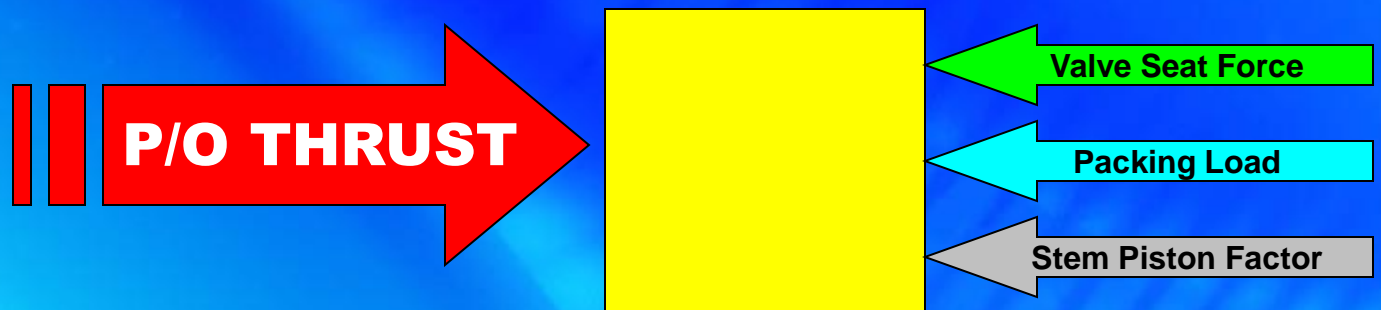
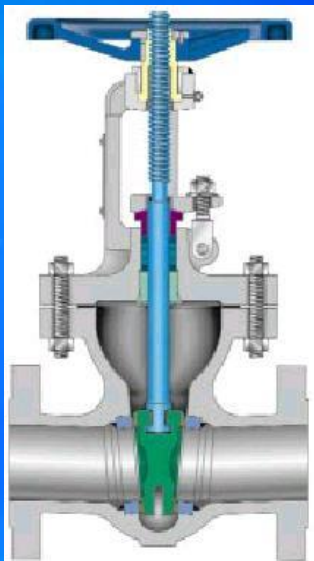
Fuerza del Fluido sobre la Válvula.

- **Packing Load:**

Roze del Vástago con el Empaque.

- **Stem Piston Factor**

Efecto Pistón o Inyectadora.



DIMENSION. MULTIVUELTAS

EMPUJE PICO (PULL OUT THRUST)

$$\text{P/O Thrust} = \text{Valve Seat Force} + \text{[Cyan Box]} + \text{[Grey Box]}$$

Fuerza del Fluido sobre la Válvula

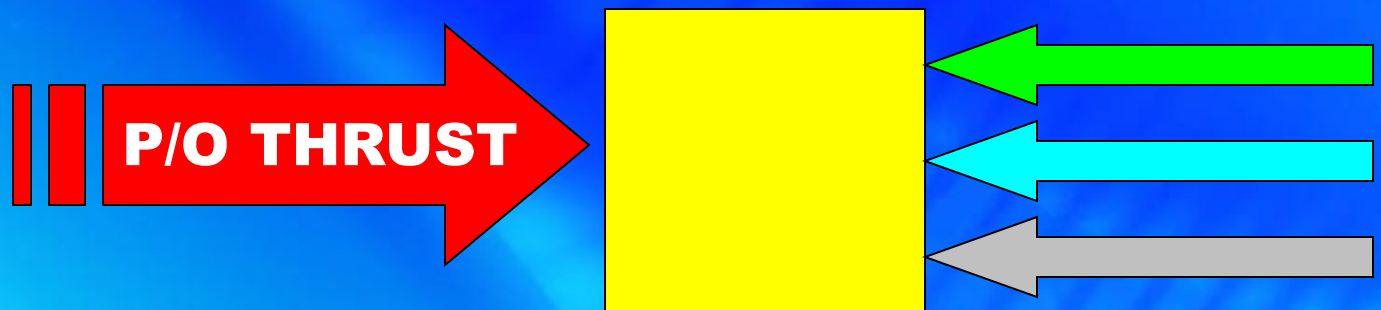
$$\text{Valve Seat Force} = A_1 \times \Delta P \times K$$

Valve Seat Force = Seat Area (in²) x ΔP (lbs/ in²) x Seat Factor

Valve Seat Force = (Seat Diameter² x Π / 4) x ΔP x Seat Factor

Valve Seat Force = 19095 lbs

Size (in)	24
Seat Diam. (in)	23,25
Núm. de Cuer.	2
Stem Diam (in)	2,25
Pitch (in)	0,33
Lead (in)	0,66
ΔP (psi)	150
Seat Factor	0,3
F. Seguridad	1,2



DIMENSION. MULTIVUELTAS

EMPUJE PICO (PULL OUT THRUST)

$$\text{P/O Thrust} = \text{Valve Seat Force} + \text{Packing Load} + \text{Friction Force}$$

Fuerza de Fricción con el Packing

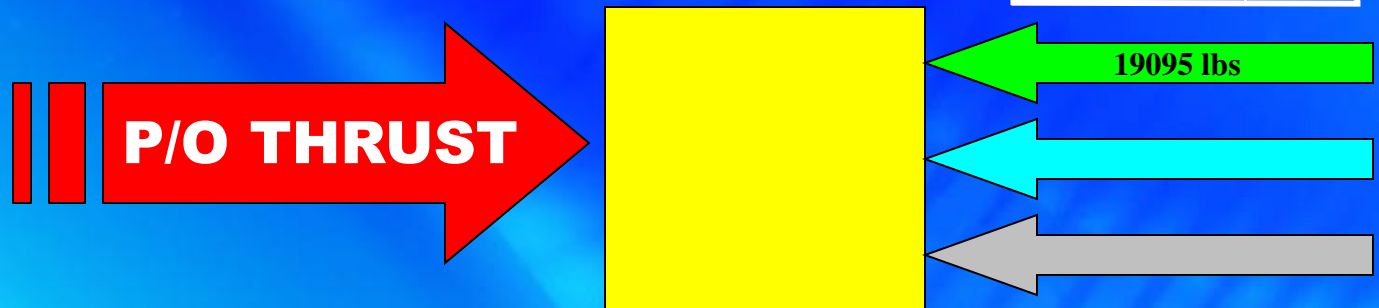
$$\text{Packing Load} = \text{Stem Diameter} \times \text{Factor del Material}$$

Packing Load = Stem Diameter (in) x Factor del Material (lbs/in)

$$\text{Packing Load} = 2500 \text{ lbs}$$

Diameter (in)	Thrust
Up to 1	1000
1 1/8 to 1 1/2	1500
1 5/8 to 2 1/2	2500
2 5/8 to 4	4000
4 1/8 to 6	5000

Size (in)	24
Seat Diam. (in)	23,25
Núm. de Cuer.	2
Stem Diam (in)	2,25
Pitch (in)	0,33
Lead (in)	0,66
ΔP (psi)	150
Seat Factor	0,3
F. Seguridad	1,2



DIMENSION. MULTIVUELTAS

EMPUJE PICO (PULL OUT THRUST)

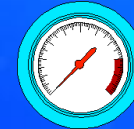
$$\text{P/O Thrust} = \text{Valve Seat Force} + \text{Packing Load} + \text{Stem Piston Factor}$$

Fuerza del Fluido sobre el Vástago (Efecto Inyectadora o Pistón)

Stem Piston Factor =



X

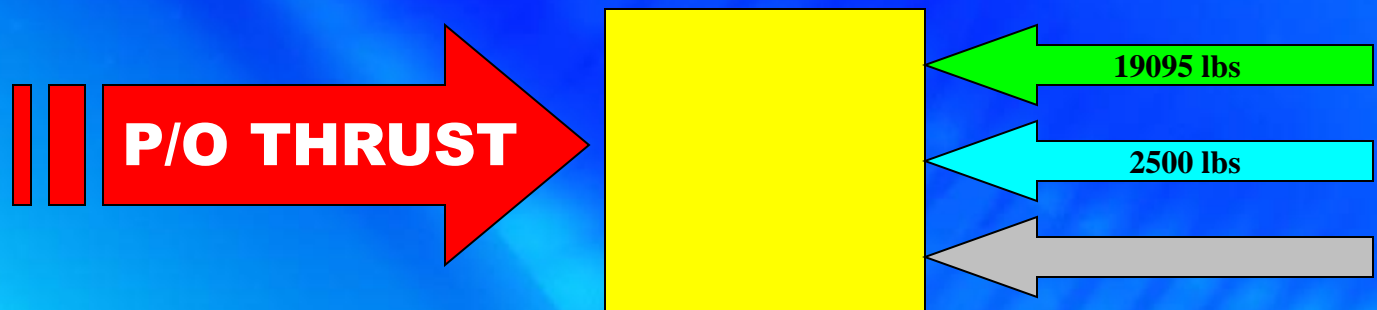


Stem Piston Factor = Stem Area (in²) x ΔP (lbs/ in²)

Stem Piston Factor = (Stem Diameter² x Π / 4) x ΔP

Stem Piston Factor = 597 lbs

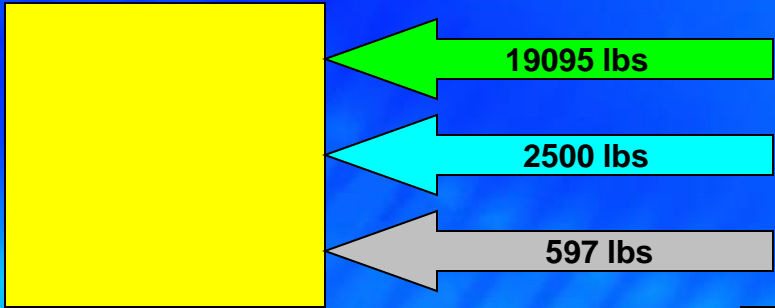
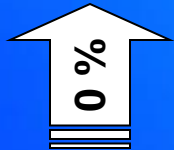
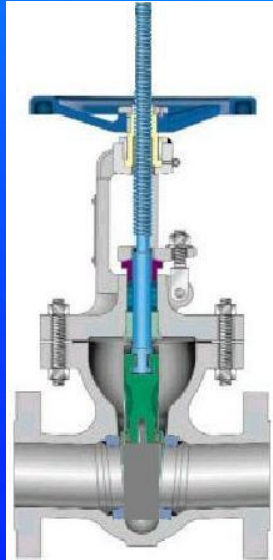
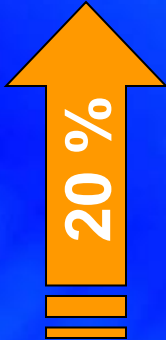
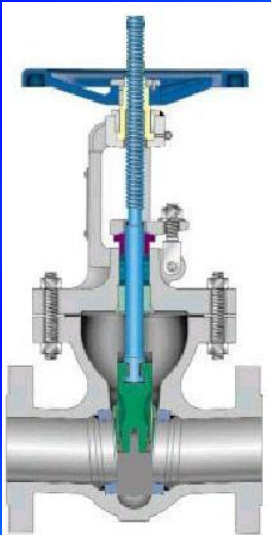
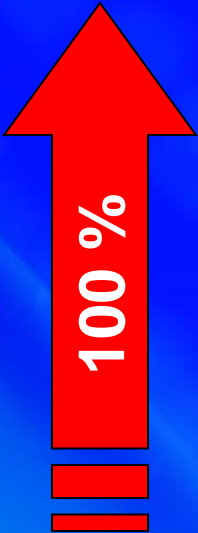
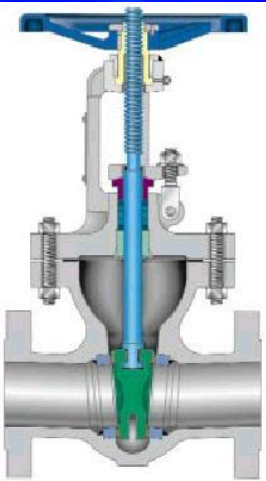
Size (in)	24
Seat Diam. (in)	23,25
Núm. de Cuer.	2
Stem Diam (in)	2,25
Pitch (in)	0,33
Lead (in)	0,66
ΔP (psi)	150
Seat Factor	0,3
F. Seguridad	1,2



DIMENSION. MULTIVUELTAS

EMPUJE PICO (PULL OUT TRUSH)

$$\text{P/O Thrust} = \text{Valve Seat Force} + \text{Packing Load} + \text{Stem Piston Factor}$$



DIMENSION. MULTIVUELTAS

TORQUE PICO (PULL OUT TORQUE)

$$\text{P/O Torque (lbs.ft)} = \text{P/O Thrust (lbs)} \times \text{Stem Factor (ft)}$$

$$\text{P/O Thrust} = 22192 \text{ lbs}$$

Factor de Conversión de Empuje a Torque → Acme Stem

(Stem Diameter, Pitch, Lead, Friction, Helix Angle, Stem Thread Angle, Material, etc)

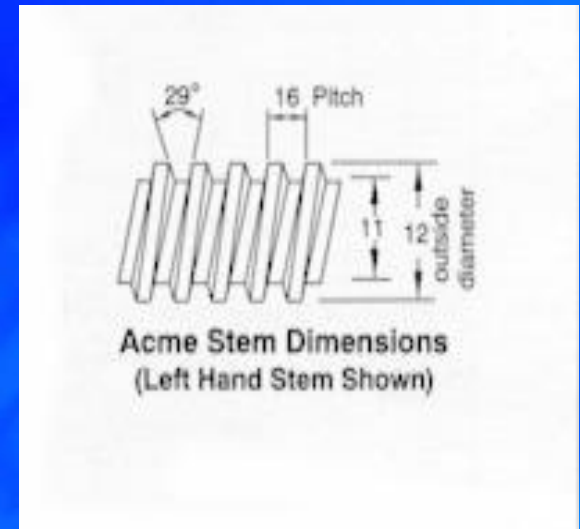
$$\text{Stem Factor} = \frac{d \times ((0,96815 \times a) + u)}{24 \times (0,96815 - (u \times a))}$$

$$d = \text{Stem Diameter} - 0,5 \times \text{Pitch}$$

$$a = \text{Lead} / (3,1416 \times d)$$

$$u = 0,2$$

$$\text{Stem Factor} = 0,0273 \text{ ft}$$



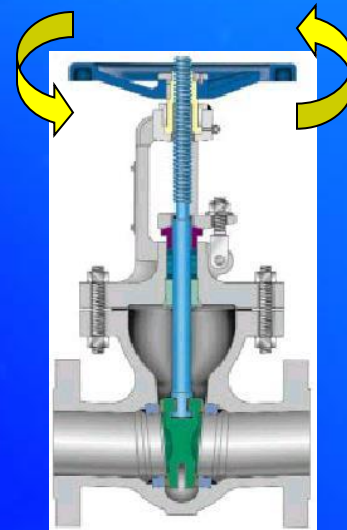
TORQUE PICO (PULL OUT TORQUE)

$$\text{P/O Torque (lbs.ft)} = \text{P/O Thrust (lbs)} \times \text{Stem Factor (ft)}$$

$$\text{P/O Thrust} = 22192 \text{ lbs}$$

$$\text{Stem Factor} = 0,0273 \text{ ft}$$

$$\text{P/O Torque (lbs.ft)} = 607 \text{ lbs.ft}$$



P/O THRUST > 22192 lbs

19095 lbs

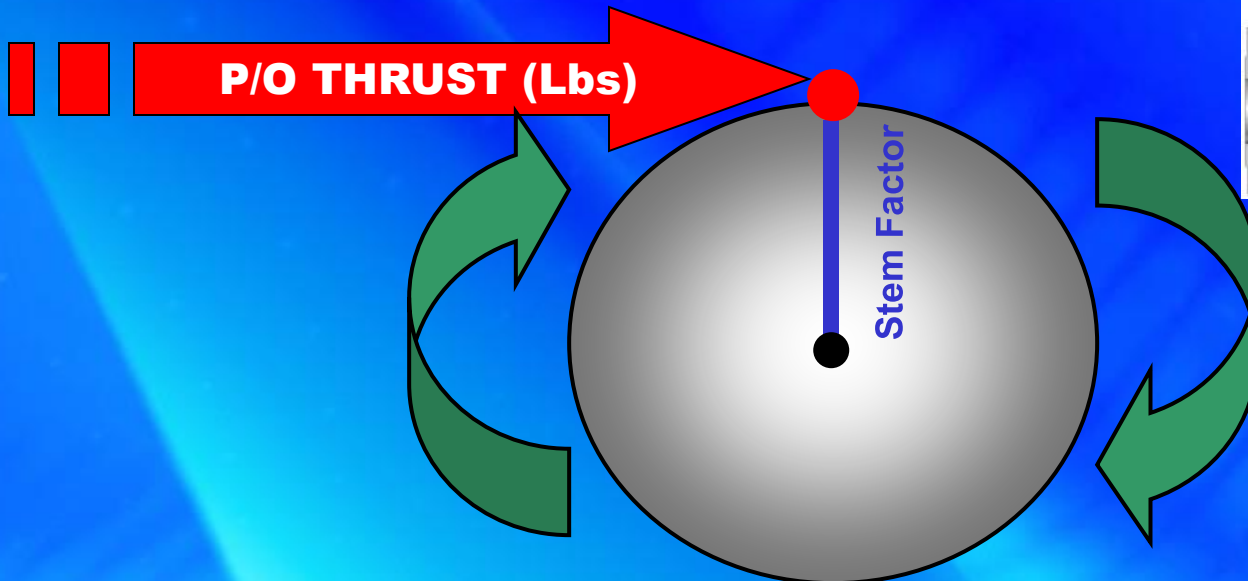
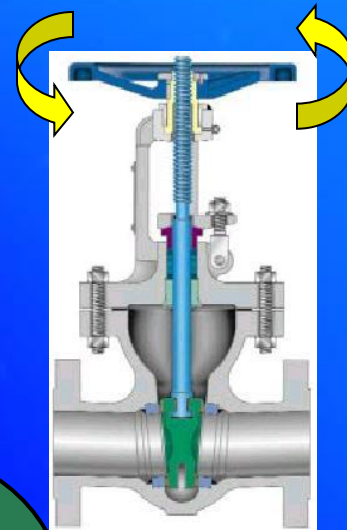
2500 lbs

597 lbs

TORQUE PICO (PULL OUT TORQUE)

$$\text{P/O Torque (lbs.ft)} = \text{P/O Thrust (lbs)} \times \text{Stem Factor (ft)}$$

$$\text{P/O Torque (lbs.ft)} = 607 \text{ lbs.ft}$$



DIMENSION. MULTIVUELTAS

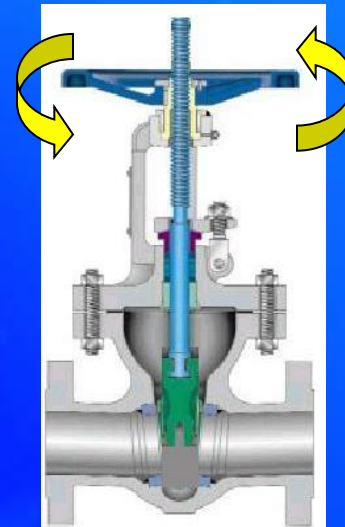
TORQUE EN FUNCIONAMIENTO (RUN)

$$\text{Run Torque} = (\text{Packing Load} + \text{Stem Piston Factor}) \times \text{Stem factor}$$

$$\text{Run Thrust} = 3097 \text{ lbs}$$

$$\text{Stem Factor} = 0,0273 \text{ ft}$$

$$\text{Run Torque (lbs.ft)} = 85 \text{ lbs.ft}$$



RUN THRUST = 3097 lbs

~~1900 lbs~~

2500 lbs

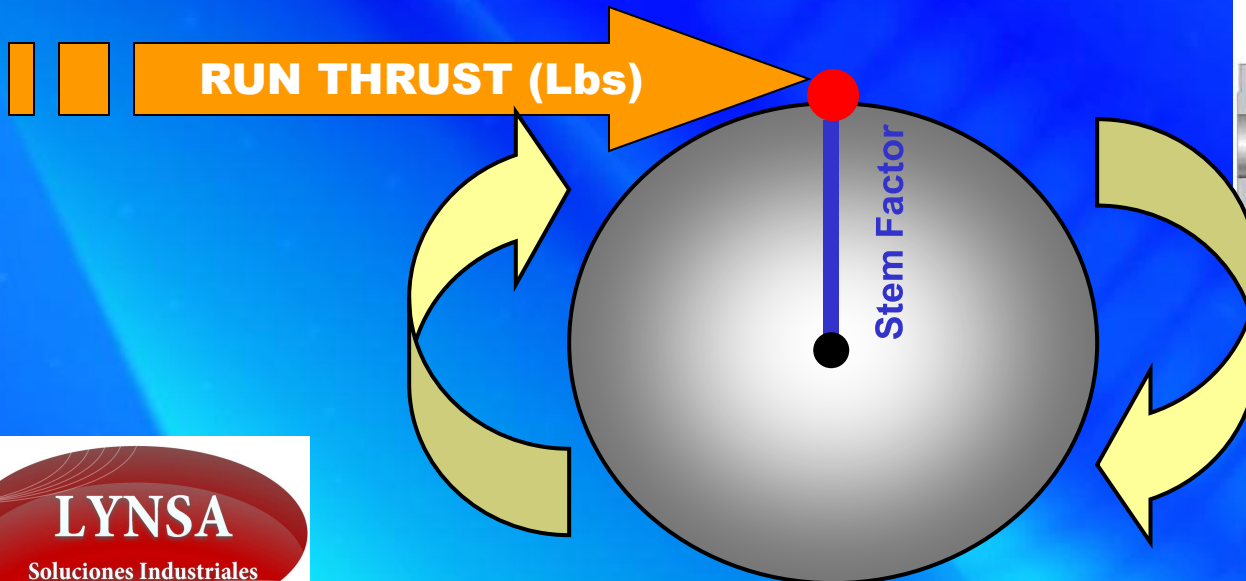
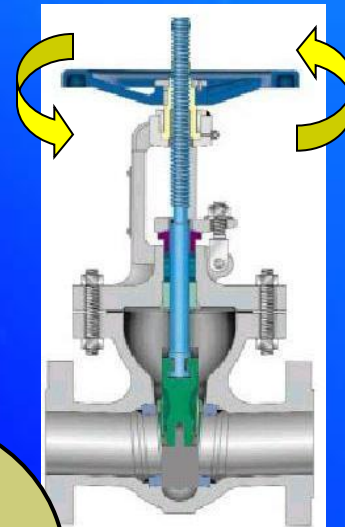
597 lbs



TORQUE PICO (PULL OUT TORQUE)

$$\text{Run Torque} = (\text{Packing Load} + \text{Stem Piston Factor}) \times \text{Stem factor}$$

$$\text{Run Torque (lbs.ft)} = 85 \text{ lbs.ft}$$



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DIMENSION. MULTIVUELTAS

VELOCIDAD DE SALIDA (RPM)

$$\text{Output Speed Max (RPM)} = \frac{\text{Stem Turn (Rev)}}{\text{Time (min)}}$$

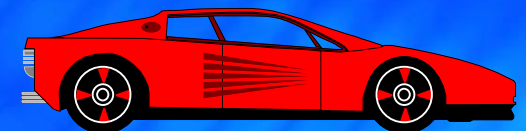
$$\text{Stem Turn (Rev)} = \frac{\text{Size Valve (in)}}{\text{Lead (in)}}$$

$$\text{Stem Turn (Rev)} = 36$$

$$\text{Time (min)} = \frac{\text{Size Valve} \times 1 \text{ min}}{12 \text{ in}}$$

$$\text{Time} = 2 \text{ min}$$

$$\text{Output Speed Max} = 18 \text{ RPM}$$



Size (in)	24
Seat Diam. (in)	23,25
Núm. de Cuer.	2
Stem Diam (in)	2,25
Pitch (in)	0,33
Lead (in)	0,66
ΔP (psi)	150
Seat Factor	0,3
F. Seguridad	1,2

RESULTADOS DEL CÁLCULO

VÁLVULA NUEVA

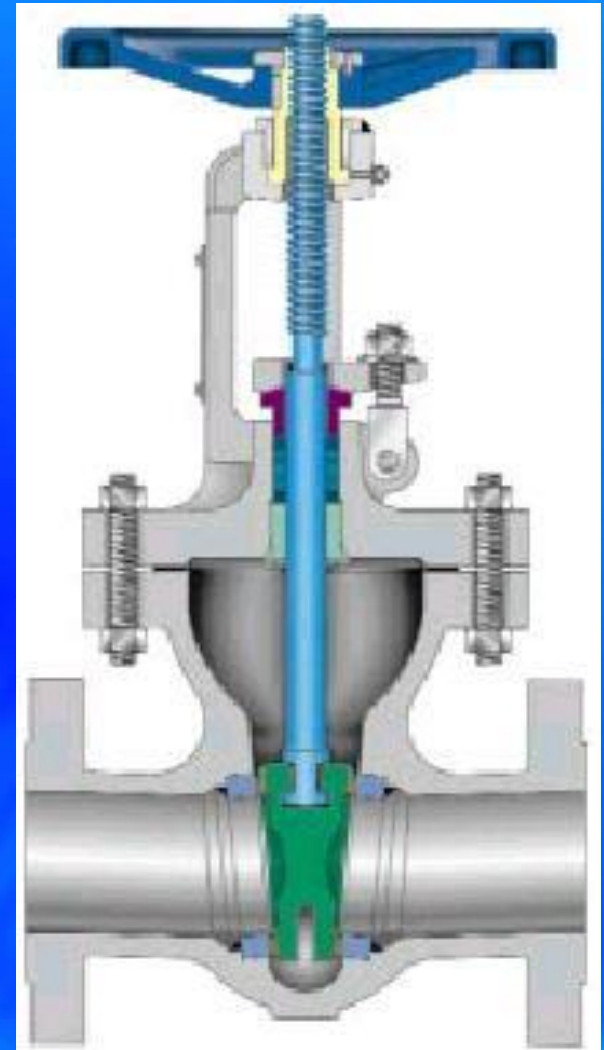
P/O Thrust = 22192 lbs

P/O Torque = 607 lbs.ft

Run Torque = 85 lbs.ft

Output Speed Max = 18 RPM

Stem Diameter = 2,25 in



DIMENSION. MULTIVUELTAS

RESULTADOS FACTOR DE SEGURIDAD

FACTOR DE SEGURIDAD 1,2
VÁLVULA USADA

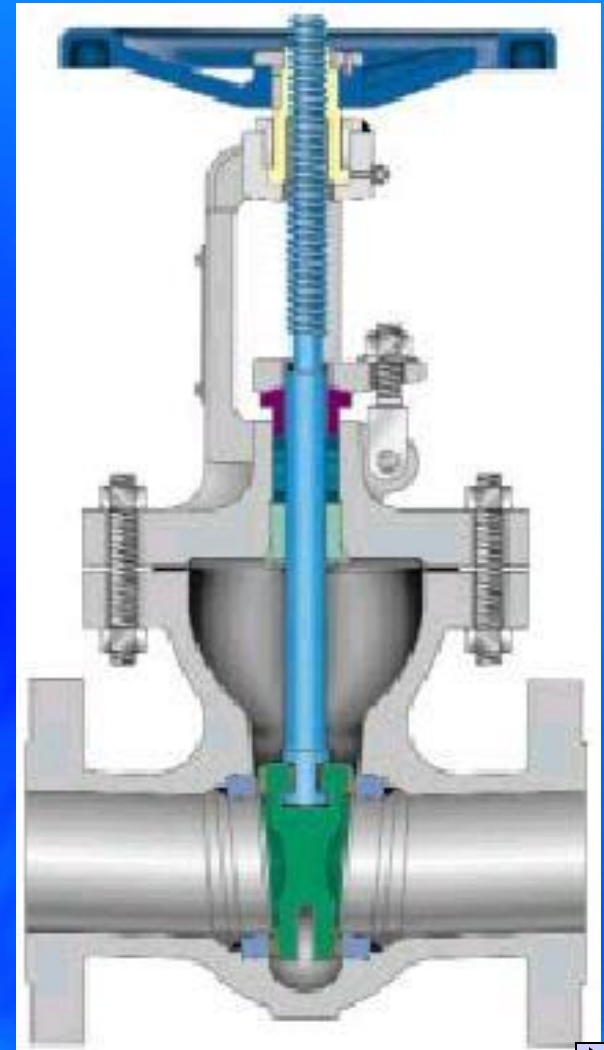
P/O Thrust = 26630 lbs

P/O Torque = 728 lbs.ft

Run Torque = 102 lbs.ft

Output Speed Max = 18 RPM

Stem Diameter = 2,25 in



SELECCIONAR MODELO

- **Buscar Sección de Actuadores.**
- **Visualizar la Sección de Velocidad (RPM) que corresponda.**
- **Avanzar de Arriba hacia Abajo y de Izquierda a Derecha barriendo todos los modelos hasta encontrar el que cumpla con todas las especificaciones.**



DIMENSION. MULTIVUeltas

Ejemplo: SELECCIONAR MODELO EIM



E2K-910-0402
(MSS Mounting Base)

Sheet 2 of 7

TORQUE SIZING SUITABLE FOR FUTRONIC II

Note: All Models with prefix "E" (EXXX-X) have ISO Mounting Base

M2CP ELECTRIC MULTI-TURN ACTUATORS

460/230 VOLT, 3 PHASE, 60 HZ

THRUST & TORQUE DESIGN - OPEN/CLOSE SERVICE

FOR 230 VOLT, CHANGE MODEL NO. -3 TO -2

NOTE: ALL BOLD & ITALIC LISTINGS USE NON-LOCKING GEAR SETS

(MOTOR AMPERAGE WILL DOUBLE)

Output Speed (rpm)	Max. Thread Stem (inch)	Max. Thrust (lb)	P/O Torque @ 414V (ft-lb)	Run Torque		Peak Torque @ 460V (ft-lb)	EIM Model No.	Outline Drawing	Appr. Wt. (lb)	Motor Data				LIST PRICE				
				15 min @ 460V (ft-lb)	30 min @ 460V (ft-lb)					Motor Size (HP)	15 Min Run (amps)	30 Min Run (amps)	Peak (amps)	Non-Integral	460 Volt Integral	230 Volt Integral		
15	1.38	10,000	130	80	55	211	1CFA-3	1-0001/10G	125	0.25	1.5	1.2	3.8					
			2.25	30,000	244	150	100	368	2DFG-3	2-0001/14G	153	0.50	2.0	1.6	6.3			
					325	190	130	496	2EFG-3		155	0.75	2.3	1.8	8.1			
	3.00	45,000	410	250	165	601	2FGG-3	3-0001/16G	160	1.00	3.1	2.5	12.1					
			367	220	145	524	310		200	1.00	3.1	2.5	12.1					
			524	310	200	205	1.50		3.8	21.2								
			900	470	310	205	1.50		3.8	21.2								
	3.50	60,000	1,400	610	370	2,107	1,230	315	3.2	6.0	4.8	34.5						
			1,464	610	370	2,107	1,230	315	3.2	6.0	4.8	34.5						
	4.00	95,000	2,107	1,230	800	2,800	1,390	370	3.2	6.0	9.0	52.8						
			2,800	1,390	800	2,800	1,390	370	3.2	6.0	9.0	52.8						
	4.50	155,000	3,062	1,390	900	4,400	1,645	570	6.0	10.5	10.5	61.3						
			4,400	1,645	900	4,400	1,645	605	6.0	10.5	10.5	61.3						
	4.80	200,000	6,600	2,330	1,290	11,957	11,957	ENWE-3	E-M313/35G	670	7.50	23.9	19.1	150				
			6,892	2,330	1,290	11,957	11,957	ENWG-3	E-M413/40G	1010	7.50	23.9	19.1	150				
5.50	245,000	6,892	2,330	1,290	11,957	11,957	ENWG-3	E-M413/40G	1010	7.50	23.9	19.1	150					
		6,892	2,580	1,380	12,309	12,309	EPWG-3		1020	8.00	23.2	18.6	163.5					
4.50	350,000	7,663	2,490	1,335	11,873	11,873	EPUV-3	E-B803/40G	1170	8.00	23.2	18.6	163.5					
18	1.38	10,000	126	75	50	185	1CGA-3	1-0001/10G	125	0.25	1.5	1.2	3.8					
			130	80	55	322	1DGA-3		128	0.50	2.0	1.6	6.3					
	2.25	30,000	220	130	90	322	2DGG-3	2-0001/14G	153	0.50	2.0	1.6	6.3					
			292	170	120	434	2EGG-3		155	0.75	2.3	1.8	8.1					
			410	235	165	601	2FGG-3		160	1.00	3.1	2.5	12.1					
	3.00	45,000	318	190	130	502	3ELK-3	3-0001/16G	195	0.75	2.3	1.8	8.1					
			453	270	180	695	3FLK-3		200	1.00	3.1	2.5	12.1					
	3.00	45,000	778	415	310	1,180	3GLK-3	3-0001/16G	205	1.50	4.8	3.8	21.2					
			900	535	360	1,913	3JLK-3		215	3.20	6.0	4.8	34.5					

3GLK-3

P/O Thrust = 26630 lbs

P/O Torque = 728 lbs.ft

Run Torque = 102 lbs.ft

Output Speed Max = 18 RPM

Stem Diameter = 2,25 in

1/4 DE VUELTA (GIRO DE 90°)

- **Seleccionar la válvula.**
- **Obtener Datos de la Válvula.**
- **Obtener Datos del Proceso.**
- **Obtener el Torque del Fabricante:**
 - **Gráfica.**
 - **Tabla.**
 - **Cálculo del Torque**
- **Seleccionar Actuador .**

DATOS DE LA VÁLVULA

- Fabricante = KITZ
- Tipo = Mariposa Soft Seat
- Tamaño = 12 inches
- Clase = 150
- Diametro Vástago = 1,5 in



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DATOS DEL PROCESO

- $\Delta P = 150 \text{ psi}$
- **Fluido = Gas**
- **Temperatura = 100°F**
- **Tiempo de uso de la Válvula = Nueva**
- **Velocidad de Cierre = 60 seg**



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DIMENSION. 1/4 DE VUELTA

SELECCIÓN DEL TORQUE

VALVE SIZE	SOFT SEAT			
	SEAT UPSTREAM (SUS)		SEAT DOWNSTREAM (SDS)	
	0-150 PSIG	285 PSIG	0-150 PSIG	285 PSIG
3"	200	270	200	320
4"	225	470	410	610
6"	540	680	860	1320
8"	910	1620	1620	2580
10"	1620	2530	2630	4550
12"	2530	3600	4160	6350
14"	3720	5970	6200	9000
16"	5530	9180	9000	14700
18"	6840	11900	14500	20100
20"	10020	16970	18000	27200
24"	18330	32290	28100	43000
30"	32330	56930	45500	71800
36"	47000	81000	66000	102000
42"	65000	111000	92000	140000
48"	83000	146000	115000	184000

2530 lbs.in = 211 lbs. ft

RESULTADOS DEL CÁLCULO

VÁLVULA NUEVA

P/O Torque = 211 lbs.ft

Run Torque = 43 lbs.ft

Time Operation = 60 Seg

Stem Diameter = 1,25 in



SELECCIONAR MODELO ACTUADOR

- **Buscar Sección de Actuadores 1/4 de Vuelta.**
- **Visualizar la Sección de Velocidad (Seg) que corresponda.**
- **Avanzar de Arriba hacia Abajo y de Izquierda a Derecha barriendo todos los modelos hasta encontrar el que cumpla con todas las especificaciones.**

DIMENSION. 1/4 DE VUELTA

EJEMPLO SELECCIONAR MODELO EIM



E2K-960-0102

(MSS Mounting Base)

Sheet 2 of 4

M2CP ELECTRIC PART-TURN ACTUATORS

460/230 VOLT, 3 PHASE, 60 HZ

90° WORM GEAR DRIVES

FOR 230 VOLT, CHANGE MODEL NO. -3 TO -2 (MOTOR AMPERAGE WILL DOUBLE)

OPEN/CLOSE SERVICE

TORQUE SIZING SUITABLE FOR FUTRONIC II

O.T. (sec)	Max. Shaft Dia. (inch)	P/O Torque @ 414V (ft-lb)	Run Torque		Peak Torque @ 460V (ft-lb)	EIM Model	Outline	Appr. Wt.	Motor Data				LIST PRICE							
			15 min @ 460V (ft-lb)	30 min @ 460V (ft-lb)					Motor Size (HP)	15 Min Run (amps)	30 Min Run (amps)	Peak (amps)	Non-Integral	460 Volt Integral	230 Volt Integral					
30	5.00	7,500	4,728	3,683																
	6.00	9,318	5,132	3,996																
		14,000	6,579	4,745																
	7.00	25,092	13,619	10,591																
		30,000	15,386	12,133																
	60	1.13	210	103	62															
2.00		250	103	62																
		661	256	154																
750		410	246			Q5G2-3		100	0.08	0.3	0.2	1.2								
3.25		1,500	475	285	2,595	R5L6-3	R-0003/16G	180	0.08	0.3	0.2	1.2								
		1,500	1,009	605	3,652	R7L6-3		180	0.17	0.6	0.4	1.9								
3.25	2,500	2,067	1,607	3,904	MCG1-3	M-2001/16G	230	0.25	1.5	1.4	3.8									
4.00	5,000	3,605	3,004	6,510	MDF3-3	M-3001/30G	345	0.50	2.0	1.7	6.3									
5.00	7,500	4,407	3,706	12,018	MEF4-3		350	0.75	2.3	2.1	8.1									
6.00	7,288	4,212	3,542	11,489	MEL5-3	M-5001/40G	765	0.75	2.3	2.1	8.1									
	10,136	5,840	4,500	15,893	MFL5-3		770	1.00	3.1	2.6	12.1									
	14,000	9,095	7,085	26,998	MGL5-3		775	1.50	4.8	4.0	21.2									
	30,000	13,403	9,668	50,206	WJMR-3		W-5001/40G	900	3.20	6.0	5.2	34.5								
8.00	33,009	13,256	9,562	49,657	MJPP-3	M-7A01/48G	1135	3.20	6.0	5.2	34.5									
	50,000	26,016	20,247	80,007	MKPP-3	M-7A02/48G	1140	4.00	11.2	9.6	52.8									
8.00	56,146	27,397	21,322	84,255	WKSB-3	W-7A02/48G	1200	4.00	11.2	9.6	52.8									
	70,000	30,951	24,417	114,632	WLSB-3		1210	5.00	13.1	11.2	61.3									

P/O Torque = 211 lbs.ft

Run Torque = 43 lbs.ft

Time Operation = 60 Seg

Stem Diameter = 1,25 in

TIPOS DE CONTROL

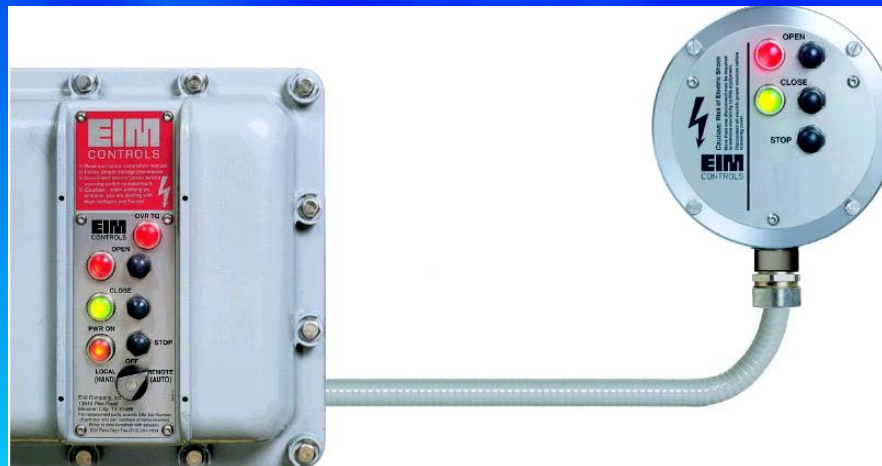
- **Control Local**
 - Panel en la tapa frontal del Actuador
 - Panel en una estación de mando local.
- **Control Remoto.**
 - **Hardwired (Cableada “N” hilos)**
 - Contactos Secos (Continuidad)
 - Tensión de Control (120VAC, 24VDC, etc)
 - **Comunicación a dos (2) Hilos (Protocolo)**
 - Directo a un Host (PLC)
 - Con una Maestra (Network Master)
 - **Posicionamiento (Modulación)**

CONTROL LOCAL

- Panel en la tapa frontal del Actuador

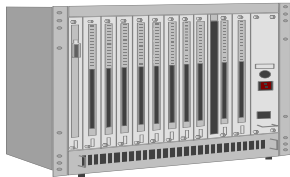


- Panel en una estación de mando local.



CONTROL REMOTO

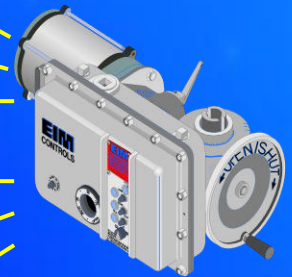
- HARDWIRED CON CONTACTOS SECOS



OPEN

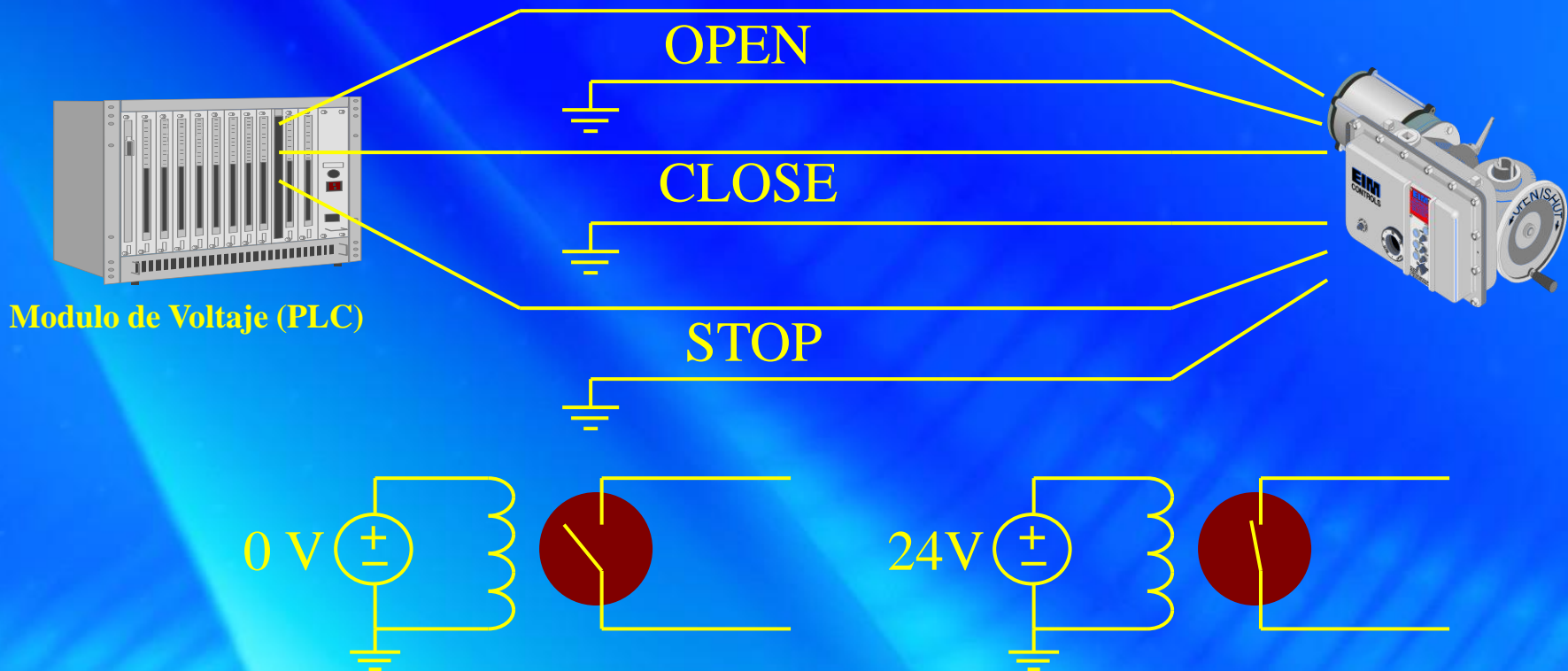
CLOSE

STOP



CONTROL REMOTO

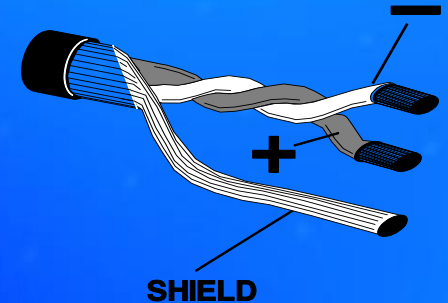
- HARDWIRED CON TENSIÓN DE CONTROL (RELAY)



CONTROL REMOTO

- **COMUNICACIÓN A DOS HILOS**

Es un tipo de comunicación que permite el control y conocer el Status de un conjunto de actuadores



** Serial communication

** 2-wire control

** Digital communication

** Bus, Ring, Loop, Multidrop

** Data highway

** RS-485, -422, -232

** SCADA, DCS

** Modbus

** ProfiBus, BitBus

** DeviceNet

** Fieldbus

** Lazo de Corriente

CONTROL REMOTO



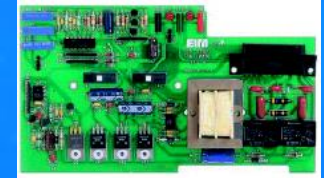
- COMUNICACIÓN A DOS HILOS (PLC o HOST)



- COMUNICACIÓN A DOS HILOS (CON MAESTRA)



CONTROL REMOTO



- **POSICIONAMIENTO (MODULACIÓN)**
- **Features**
 - 4-20 mA position Control.
 - 4-20 mA Position feed back.
- **Futronic II**
 - +/- 2% accuracy
 - 100 starts per hour (1 phase)
 - 600 starts per hour (3 phase)
- **Futronic III (90v DC Motor)**
 - +/- .5 % Accuracy
 - 1200 starts per hour.
- **Futronic IV**
 - +/- 1% accuracy
 - 3 Phase motor.
 - 1200 starts Per Hour.
- **Futronic VIII**
 - =/- .12% accuracy - high speed/ high torque
 - VFD Motor control