



Misceláneas

Miscellaneous

En un mismo Proceso Industrial nos encontramos con distintas particularidades que hacen que la válvula a instalar tenga una construcción singular, con características propias a cada necesidad. Cada circunstancia genera cuestiones como "¿qué opciones hay?, ¿de qué datos disponemos?, ¿será acertada la decisión?".

KCE, quiere proporcionar respuestas efectivas a cada pregunta. A continuación, les ofrecemos documentación técnica fundada en nuestra experiencia y "know how", así como diferentes ejecuciones especiales concebidas en base a nuestros ensayos e investigación. Soluciones seguras, permanentemente.

It so happens that the same Industrial Process presents different traits compelling the valve that has to be set up to have a specific design, with characteristics adjusted to each requirement. Each circumstance generates specific questions such as: which are the options?, what information do we have available?, will I make the right decision?

We at KCE want to give you straight answers to each question. You will find attached technical information based on our experience and our know-how, as well as different special executions that have been developed based on our tests and our research. KCE solutions: safe and permanent.

Fig. F14D (SS, CS) & F14 (CI). Pg. 16-19

Válvula DIN, conexión bridada, paso total.
DIN valve, flanged ends, full bore.

Material Material	Longitud Length	PN (2) PN (2)	DN											
			15	20	25	32	40	50	65	80	100	125	150	200
SS	Corta/Short	PN16	■											
		PN40	■											
		PN100 (1)	■											
CS	Corta/Short	PN16	■											
		PN40	■											
		PN100 (1)	■											
CI	Corta/Short	PN16	■											

(1) Longitud según Ansi 600 (ANSI B16.10).

(1) Length according to Ansi 600 (ANSI B16.10).

(2) PN10, 25 y 63, también disponibles, consultar KCE.

(2) PN10, 25 and 63, also available, consult KCE.

**Fig. VU29 (PN70), VU19 (PN16)
F21A (PN70) & F21 (PN16). Pg. 24-25**

Válvula de 3pcs, conexión roscada, soldada o "fondo de cuba". (1)
3-piece valve, screwed, welded or "tank bottom" (1) ends.

Material Material	Paso Bore	Conexión Ends	NPS											
			1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	
SS	FB	BSP	■											
		NPT	■											
		SW mm	■	■	■	■	■	■	■	■	■	■	■	■
		SW Sch	■											
		BW	■											
	"fondo/bottom"	■												
	RB	BSP	■											
		NPT	■											
		SW mm	■											
		SW Sch	■											
BW		■												
CS	FB	BSP	■											
		NPT	■											
		SW Sch	■											
		BW	■											
		"fondo/bottom"	■											
	RB	BSP	■											
		NPT	■											
		SW Sch	■											
		BW	■											

(1) Válvulas de "fondo de cuba" incluyen un extremo bridado para soldar a la cuba y otro extremo conexión rosca o SW.

(1) "Bottom tank" valves, have one flanged side for tank welding and one screwed or SW side.

Fig. F14A. Pg. 20-21

Válvula ANSI, conexión bridada, paso total.
ANSI valve, flanged ends, full bore.

Material Material	Longitud Length	Clase Rating	NPS											
			1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"	
SS	Corta/Short	Ansi150	■											
		Ansi300	■											
		Ansi600	■ (1)											
CS	Corta/Short	Ansi150	■											
		Ansi300	■											
		Ansi600	■ (1)											
SS	Larga/Long	Ansi150	■											
		Ansi300	■											
		Ansi600	■											
CS	Larga/Long	Ansi150	■											

(1) Sólo disponible: RB

(1) Only available: RB

Fig. HB. Pg. 28-29

Válvula Clase 800, conexión roscada o soldada, paso total o reducido.
Class 800 valve, screwed or welded ends, full or reduced bore.

Material Material	Paso Bore	DN						
		1/4"	3/8"	1/2"	3/4"	1"	1 1/2"	2"
SS	FB	■						
	RB	■						
CS	FB	■						
	RB	■						

Fig. BF6K (1pc), F14A (2pcs) & F18A (3pcs). Pg. 22-23

Válvula ANSI, conexión bridada, paso reducido.
ANSI valve, flanged ends, reduced bore.

Material Material	Clase Rating	NPS													
		1/2"	3/4"	1"	1 1/2"	2"	3"	4"	6"	8"	10"	12"	14"	16"	
SS	Ansi150	■													
	Ansi300	■													
CS	Ansi150	■													
	Ansi300	■													

Nota 1: Figura F14A utilizada para A150 (12") y A300 (12").

Note 1: Figure F14A, used for A150 (12") & A300 (12").

Nota 2: Figura F18A utilizada para A150/300 (14" y 16").

Note 2: Figure F18A, used for A150/300 (14" & 16").

Fig. SB-80. Pg. 26-27

Válvula Class 800, conexión roscada, paso reducido.
Class 800 valve, screwed ends, reduced bore.

Material Material	NPS						
	1/4"	3/8"	1/2"	3/4"	1"	1 1/2"	2"
SS	■						
CS	■						

Fig. F50. Pg. 30-31

Válvula monoblock, conexión BW o PE.
1-piece body valve, BW or PE ends.

Material Material	Clase / PN Rating	Conexión (1) Ends (1)	DN					
			1 1/2"	2"	3"	4"	6"	8"
CS	Ansi 600	BW/BW						
	Ansi 300	BW/BW						
	Ansi 150	BW/BW						
	PN04	PE/PE						

(1) Disponible bajo demanda conexiones BW/RF A150 y PE/RF PNO4.

(1) Available under request end connections BW/RF A150 & PE/RF PNO4.

Fig. F14M (DIN). Pg. 38-43

Válvula DIN, conexión bridada, paso total, asientos metálicos.
DIN valve, flanged ends, full bore, metal seats.

Material Material	PN PN	DN									
		15	20	25	32	40	50	80	100	150	
SS	PN16										
	PN40										
	PN100 (1)										
CS	PN16										
	PN40										
	PN100 (1)										

(1) Longitud según Ansi 600 (ANSI B16.10)

(1) Length according to Ansi 600 (ANSI B16.10)

Fig. F18T. Pg. 44-47

Válvula ANSI, conexión bridada o soldada, paso total o reducido, esfera guiada.
ANSI valve, flanged or welded ends, full or reduced bore, trunnion mounted.

Material Material	Clase Rating	Paso Bore	DN											
			1"	2"	3"	4"	6"	8"	10"	12"	14"	16"		
SS	Ansi150	FB												
		RB												
	Ansi300	FB												
		RB												
&	Ansi600	FB												
		RB												
CS	Ansi900	FB												
		RB												
	Ansi1500	FB												
		RB												

Fig. F20 & F13. Pg. 32-35

Válvula de 3 Vías, conexión bridada o roscada, paso L o T.
3-Way valve, flanged or screwed ends, L or T port.

Material Material	Fig. Fig.	PN Rating	DN / NPS														
			8	10	15	20	25	32	40	50	65	80	100	125	150		
			1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"		
SS	F20	PN16															
		Ansi150															
	F13	PN16															
CS	F20	PN16															
		Ansi150															
CI	F13	PN16															

Fig. F14M (ANSI), (fig. HBM Class 800). Pg. 38-43

Válvula ANSI, conexión bridada, roscada o soldada, paso total o reducido, asientos metálicos.
ANSI valve, flanged, screwed or welded ends, full or reduced bore, metal seats.

Material Material	Paso Port	Clase Rating	NPS											
			1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"	5"	6"	8"
SS	RB	Ansi150												
		Ansi150												
	FB	Ansi300												
		Ansi600 Class 800												
CS	RB	Ansi150												
		Ansi150												
	FB	Ansi300												
		Ansi600 Class 800												

Nota 1: Para otros tamaños y presiones, consultar KCE.

Note 1: Other sizes and ratings, please consult KCE.

Fig. F3 (SS & CI), F26 (CI), F26D (SS). Pg. 36-37

Válvula 2pcs, conexión roscada (F3) o mixta (F26, F26D), paso total.
2-piece valve, screwed (F3) or mixed (F26, F26D) ends, full bore.

Material Material	PN PN	Fig. Fig.	DN										
			1/4"	3/8"	1/2"	3/4"	1"	1 1/4"	1 1/2"	2"	2 1/2"	3"	4"
SS	PN16	F3											
		F26-F26D											
	PN40	F3											
F26-F26D													
CI	PN16	F3											
		F26											

CAMARA DE CALEFACCION

KCE fabrica Cámaras de Calefacción totalmente en **Inoxidable**, con conexiones roscadas (BSP) o bridas, preparadas para ser adaptadas a válvulas de Acero al Carbono o Inoxidable, tanto en Norma DIN como ANSI. La **estanqueidad** de la cámara es comprobada hidráulicamente a un mínimo de **10 bar** de presión. La **estanqueidad** de la válvula es probada según Norma, antes y después de ser soldada la cámara (**doble prueba**).



STEAM JACKET

KCE manufactures fully **Stainless Steel** Steam Jackets, with screwed (BSP) or flanged ends. They have been designed to be adapted to Carbon Steel or Stainless Steel valves, both in DIN and ANSI Standards. The **water-tightness** of the jacket is hydraulically checked at a 10-bar pressure minimum. The **water-tightness** of the valve is verified - according to the Standard - before and after the jacket is welded (**double-check**).

VALVULAS LIBRES DE SILICONA VALVULAS DESENGRASADAS

En procesos como pinturas o Servicios O₂, se solicitan válvulas con una **"limpieza especial"**. KCE presenta dos soluciones: válvulas **Desengrasadas**, orientadas a Servicio O₂, y válvulas **Libres de Silicona** para el resto de aplicaciones. Ambos procesos están cubiertos por Procedimientos de Ingeniería de KCE y homologados por clientes finales, teniendo como objetivo **eliminar la existencia de grasas y siliconas**. A tal efecto, el producto es tratado especialmente en "zonas limpias", prestando especial atención a sus componentes, manipulación, pruebas, secado y examen. Finalmente el producto se etiqueta, embala en bolsa hermética e identifica, individualmente.



SILICON-FREE VALVES DEGREASED VALVES

In processes such as paints or O₂ Services, valves are requested that provide a **"special cleaning"** feature. KCE offers two solutions: **Degreased** valves for O₂ Service and **Silicon-Free** valves for the rest of applications. Both processes are covered by KCE's Engineering Procedures and are approved by end customers, the aim being to **prevent the presence of greases and silicones**. For this purpose the product is specially treated in "clean areas", where special attention is given to their components, handling, testing, drying and verification. Finally, the product is labelled, packed in a water-tight bag and individually identified.

MANETA OVALADA

Siguiendo criterios de seguridad, es de uso habitual la colocación de manetas ovaladas en válvulas hasta DN40. Este sistema, por su diseño, permite **evitar operaciones no intencionadas** que podrían causar accidentes.



OVAL HAND WHEEL

Following safety criteria, it is common practice to fit valves up to DN40 with oval hand wheels. This system, because of its design, **prevents unintentional operations** that might result in accidents.

EXTENSION DE EJE EN "T". (Ex/S)

Para maniobrar fácilmente válvulas en instalaciones con **tubería aislada** o de **difícil acceso**, es de amplia utilización la extensión de eje en "T". KCE fabrica estas extensiones, totalmente en SS, con una longitud estándar de 100 mm, o bajo demanda con longitudes de 50 o 150 mm.

"T"-STEM EXTENSION. (Ex/S)

It enables the easy operation of valves in a setup where **pipes are isolated** or have a **difficult access**. KCE manufactures these extensions -fully in SS- with a standard length of 100 mm or, under request, with 50-mm or 150-mm lengths.

EXTENSIONES PARA BAJA TEMPERATURA. (Ex/B y Ex/Cry)

Como regla general, en procesos con temperaturas bajo cero hasta -40°C, no es necesario el uso de extensiones, o como mucho, se utiliza la extensión Ex/S. A partir de -40°C, se utilizan extensiones Ex/B (-40°C a -80°C) y Ex/Cry (-80°C a -196°C) que separan la **zona del prensa del área "fría"**. La longitud varía según la temperatura y el DN de la válvula, oscilando entre 100 y 500 mm. El material de la extensión es como mínimo de la misma calidad que el cuerpo y cumple con ISO 5211.



LOW TEMPERATURE EXTENSIONS. (Ex/B & Ex/Cry)

As a general rule, in processes with temperatures below 0°C down to -40°C, it is not necessary to use the extensions; what is used at the most is the Ex/S extension. From -40°C downwards the extensions used are Ex/B (-40°C down to -80°C) and Ex/Cry (-80°C down to -196°C) separating the **packing area** from the **"cold" area**. The length varies depending on temperature and the valve's DN, ranging between 100 and 500 mm. The extension's material has at least the same quality as the body and complies with ISO 5211.

MATERIALES ESPECIALES

En algunas ocasiones, los fluidos de proceso y sus condiciones de trabajo, requieren una **resistencia adicional** que los materiales convencionales no pueden aportar. A tal efecto, KCE ofrece la posibilidad de suministrar materiales como Duplex, Superduplex, Monel, Alloy 20, Hasteloy C, LCC, CF3M (316L), CF8C entre una amplia gama disponible, capaces de cumplir con el resultado esperado.



SPECIAL MATERIALS

On some occasions the process fluids and their working conditions require an **additional resistance** which conventional materials can not provide. To this end, KCE offers the possibility to supply a wide range of materials such as Duplex, Superduplex, Monel, Alloy 20, Hasteloy C, LCC, CF3M (316L), CF8C that can meet the expected requirements.

ENCLAVAMIENTO POR CANDADO

Por cuestiones de seguridad, puede ser requerido que sólo **personas autorizadas** puedan maniobrar las válvulas. A tal efecto, todas las válvulas de bola de KCE pueden suministrarse con enclavamiento para candado, siendo esta ejecución estándar en la mayoría de ellas. A parte del diseño de KCE de fijación por candado, también pueden aceptarse otras alternativas propuestas por el cliente.



LOCKING DEVICE

Out of safety reasons the requirement may be laid down to only allow **authorized personnel** to operate the valves. For this reason all KCE ball valves can be supplied with a locking device, this execution being standard in most of them. In addition to the KCE's locking device design, other alternatives put forward by the customer can be also accepted.

DOBLE EMPAQUETADURA DE SEGURIDAD

En algunos tipos de fluidos, altamente contaminantes o tóxicamente peligrosos, se requiere una **estanqueidad exterior garantizada**, para ello, KCE aporta la solución de la "Doble Empaquetadura". Este sistema consiste en dos grupos independientes de cierre, con un detector de fugas intermedio, el cual ha sido homologado por los Clientes Finales más exigentes, con pruebas de correcto funcionamiento **hasta 433.000 ciclos**.



DOUBLE SAFETY PACKING

In some types of highly polluting or toxically dangerous fluids, **guaranteed external water-tightness** is required. KCE provides to this end the "Double Packing" solution. This system is made up of two sealing independent groups, with an intermediate leak detector. KCE's "Double Packing" has been approved by our most demanding End Customers and tested for correct operation in **up to 433.000 cycles**.

EMPAQUETADURA TIPO CHEVRON®

Siguiendo especificaciones marcadas por Clientes Finales, KCE ofrece como complemento a su cierre convencional, cierres con empaquetadura tipo Chevron®, utilizando un mínimo de 5 anillos en la zona del prensa. Esta es una valorada alternativa al cierre habitual.



CHEVRON® TYPE PACKING

Based on specifications set forth by End Customers, KCE offers, complementary to its conventional sealing, a system with Chevron®-type packing using a minimum of 5 rings in the gland area. This is a highly valued alternative to the standard sealing.

PROLONGACION DE ASIENTO

En determinadas aplicaciones de líneas de pinturas, industria alimentaria, almacenaje de productos, etc, se desea **minimizar la presencia residuos**, en la cavidad entre esfera y superficie interna de la válvula. Como solución a esta situación, KCE adapta a sus válvulas asientos prolongados o "coquillas", hechos de PTFE virgen o con carga, reduciendo considerablemente el espacio libre de la cavidad.



CAVITY FILLER

For certain applications related to paints, food processing industry, product storage, etc. an effort must be made to **minimize the presence of waste matter** in the cavity between the ball and valve's internal surface. As a solution to this situation, KCE fits its valves with cavity fillers made up of unfilled/filled PTFE, thus considerably reducing the cavity's free space.

Limitaciones de Presión - Temperatura (P - T).

En válvulas de esfera flotante con asientos blandos, los rangos P - T de funcionamiento no sólo se determinan por la resistencia del Cuerpo de la Válvula, sino también por las limitaciones de sus Juntas y Asientos. Es difícil precisar el límite P - T exacto, debido a la infinidad de combinaciones entre fluidos y condiciones, por lo que los valores mostrados a continuación, son una aproximación a la realidad, basada en nuestra experiencia.

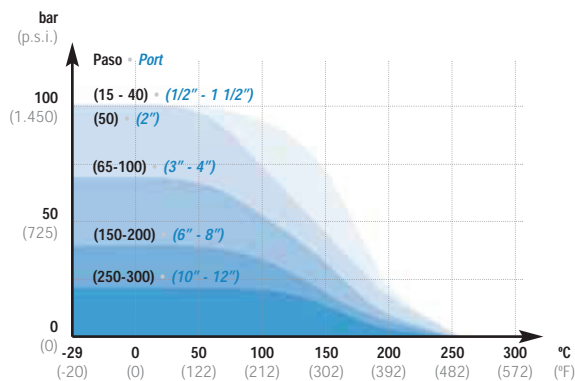
Pressure - Temperature (P - T) ratings.

The P - T operating ratings in soft-seated floating ball valves are not only determined by the resistance of the Valve Body, but also by the limitations of their Seats and Seats. It is difficult to pinpoint the accurate P - T limit because of the boundless number of combinations between fluids and conditions. This is why the values that are shown below are an approximation to reality based on our own past experience.



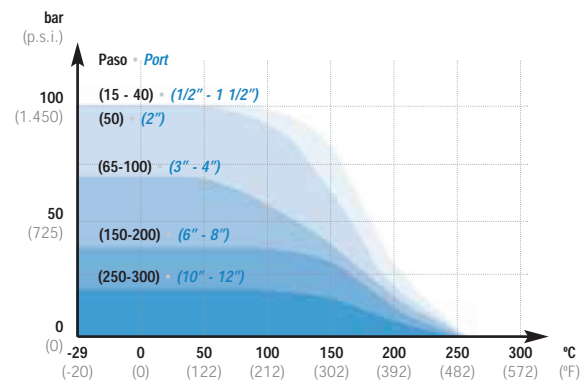
PTFE Virgen: Inerte a la mayoría de fluidos, bajo coeficiente de fricción, sujeto a limitaciones de temperatura. Buen comportamiento en aplicaciones de gas.

Virgin PTFE: Inert to most media, low friction coefficient, subject to temperature limitations. Good performance in gas applications.



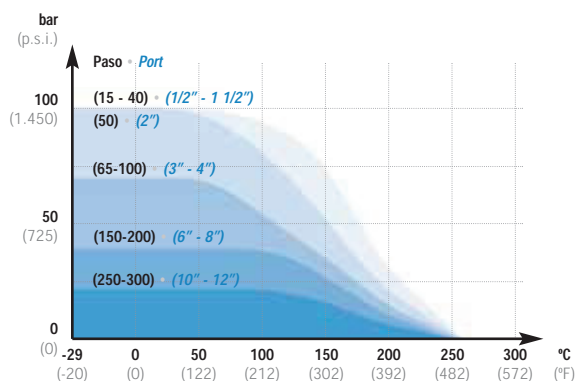
PTFE + Grafito (20% C + 5% Graf): Inerte a la mayoría de fluidos. Mayor alcance P-T que el PTFE virgen. Usado en aplicaciones de vapor y aceite térmico.

PTFE + Graphite (20% C + 5% Graph): Inert to most media. Higher P-T range than virgin PTFE. Used in steam and thermal oil applications.



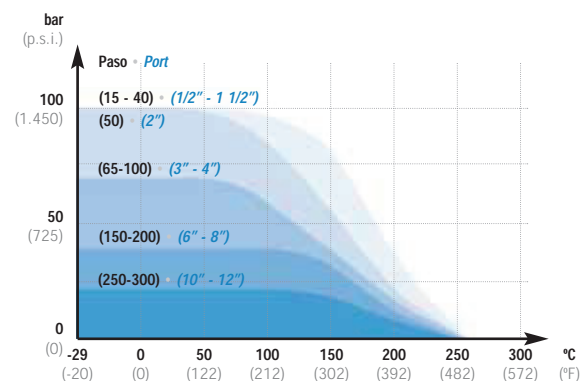
PTFE + Fibra de Vidrio (15% F.V.): Resistencia al desgaste y a la deformación bajo carga. Mayor ciclo de vida y resistencia a la Presión que el PTFE virgen. Usado en industria alimentaria, farmacéutica y cosmética.

PTFE + Glass Fibre (15% G.F.): Good resistance to wear and deformation under load. Longer service life and higher pressure resistance than virgin PTFE. Suitable for foodstuffs, pharmaceutical and cosmetic industry applications.



PTFE + Fibra de Vidrio (25% F.V.): Resistencia al desgaste y a la deformación bajo carga. Mayor ciclo de vida y resistencia a la Presión que el PTFE + 15% F.V. Usado en industria alimentaria, farmacéutica y cosmética.

PTFE + Glass Fibre (25% G.F.): Good resistance to wear and deformation under load. Longer service life and higher pressure resistance than PTFE + 15% G.F. Suitable for foodstuffs, pharmaceutical and cosmetic industry applications.





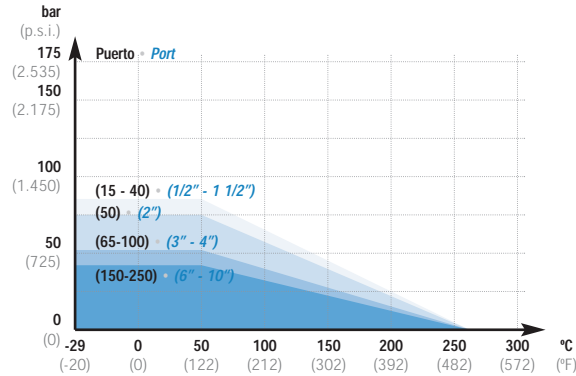
HYPATITE (PTFE + PFA + compuesto):

Buena resistencia al desgaste y compresión. Resistencia química superior al PTFE virgen.

HYPATITE (PTFE + PFA + compound):

Good resistance to wear and under load. Higher

chemical resistance than virgin PTFE.

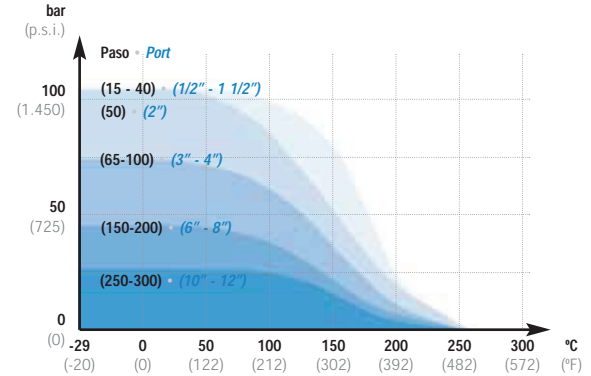


PTFE + 50% SS (Inoxidable): Buena resistencia a la presión. Utilizado para fluidos abrasivos o con partículas duras en suspensión.

PTFE + 50% SS (Stainless Steel):

Good pressure resistance. Used for abrasive fluids or

hard particles transportation.

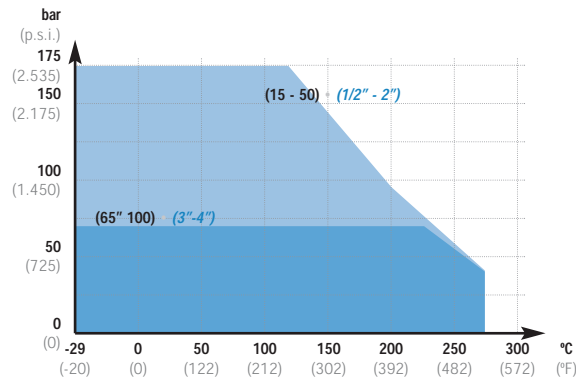


PEEK (Poli-éter-éter-cetona): Apto para Tabaco, servicios nucleares y elevadas temperaturas a alta presión. Alta fricción. No apto para Ácido Sulfúrico concentrado.

PEEK (Poly-ether-ether-ketone):

Suitable for Tobacco, nuclear services and high temperatures at high pressure.

High friction. Not recommended for concentrated Sulphuric Acid.

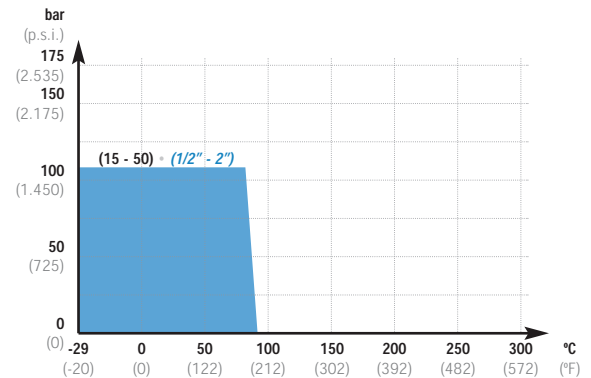


UHMWPE (Polietileno de ultra alto peso molecular): Útil para nuclear, Tabaco, industria alimentaria, H₂SO₄, etc. Bajo coeficiente de fricción.

UHMWPE (Ultra High Molecular Weight

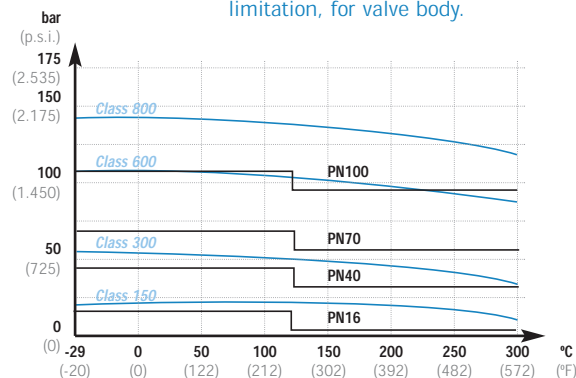
Polyethylene): Good for nuclear, Tobacco, food industry,

H₂SO₄, etc. Low friction coefficient.



Presión del Cuerpo: Limitación de resistencia a la presión del cuerpo de la válvula.

Body Rating: Pressure resistance limitation, for valve body.

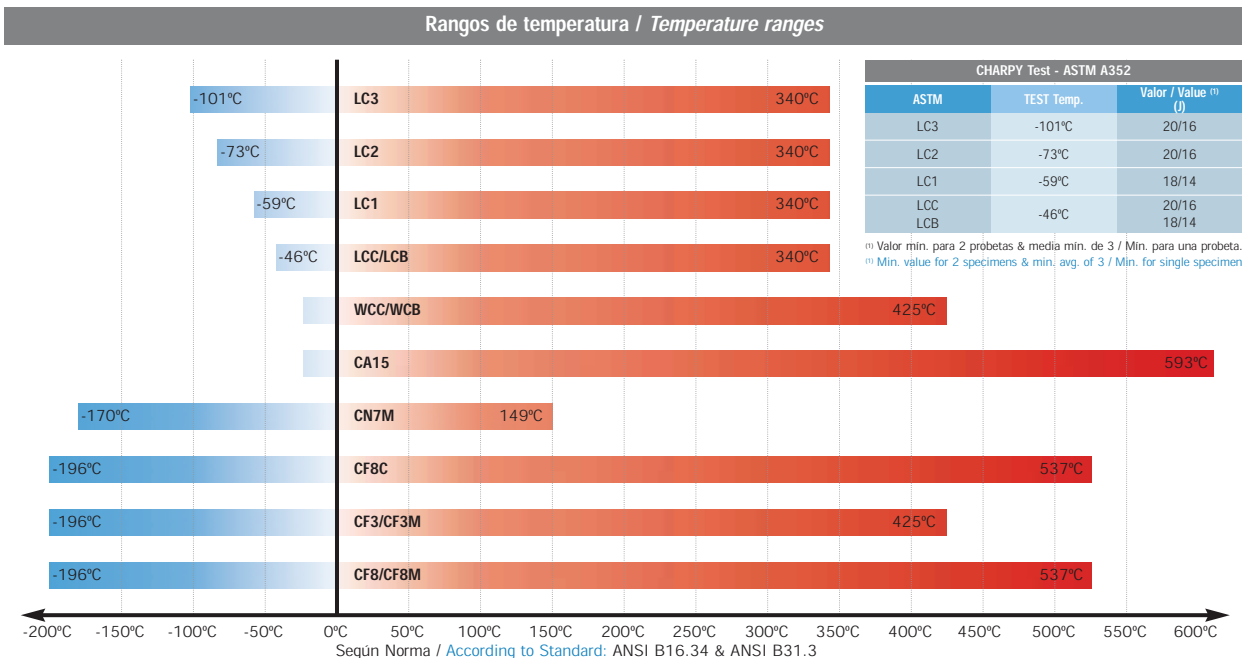


Nota: Otros materiales para asientos y juntas, como TFM 1600, PoliPropileno, PEEK+Grafito, FEP+Silicona, Fluoraz®, Kalrez®, Chemraz®, etc, están disponibles bajo demanda.

Note: Other sealing materials, like TFM 1600, Polypropylene, PEEK+Graphite, FEP+Silicone, Fluoraz®, Kalrez®, Chemraz®, etc, are available under request.

Materiales elastómeros para juntas Tóricas. O'ring elastomeric materials.			
Tipo Type	Designación ASTM ASTM Designation	Temp. (°C) / Temp. (°F)	
		Estándar / Standard	Baja Temp. / Low Temp.
Viton®	FPM/FKM	-25 °C / +230 °C	-40 °C / +230 °C
	Fluorocarbon Rubber	-13 °F / +446 °F	-40 °F / 446 °F
Nitrile	NBR	-25 °C / +140 °C	-55 °C / +100 °C
	Nitrile Butadine Rubber	-13 °F / +284 °F	-67 °F / +212 °C

Equivalencias de materiales / Material equivalences				
Material Material	Grupo Group	Equivalencia / Equivalence		Tipo Type
		ASTM	EN (DIN)	
Fundición de Hierro Cast Iron	Fundición Gris Grey Cast Iron	A126 B	EN-1561 EN-GJL-250	GG25
	Fundición Nodular Nodular Cast Iron	A536 65-45-12	EN-1563 EN-GJS-400-15	GGG40
Fundición de Acero Steel Casting	Acero Carbono Carbon Steel	A216 WCB	EN-10213-2 1.0619	A105
		A216 WCC	EN-10213-2 1.0619	
	Acero Carbono y Baja Aleación. Baja temperatura Carbon & Low Alloy Steel. Low temperature	A352 LCB	SEW 685 1.1138	
		A352 LCC	SEW 685 1.1138	LF2
		A352 LC1		
		A352 LC2	SEW 685 1.5621	
	Acero Inoxidable Martensítico. Alta Temperatura. Martensitic Stainless Steel. High Temperature	A352 LC3	SEW 685 1.5638	LF3
		A217 CA15	DIN 17445 1.4027	410 / 420
	Acero Austenítico y Duplex Austenitic & Duplex Steel	A351 CF3	SEW 410 1.4306	304L
		A351 CF3M	SEW 410 1.4404	316L
		A351 CF8	EN-10213-4 1.4308	304
		A351 CF8M	EN-10213-4 1.4408	316
		A351 CF8C	EN-10213-4 1.4552	304+Nb (Ti)
		A351 CN7M	1.4500	Alloy 20, UNS N08020
		A351 CD-4 MCu	SEW 400 1.4462	Duplex, UNS S31803
A351 CF10-MC		EN-10213-4 1.4581		
Fundición de Níquel Nickel Casting	Aleación de Níquel Nickel Alloy	A494 N-12MV		Hastelloy B
		A494 CW12MW	2.4686	Hastelloy C, UNS N06455
		A494 M-35-2	DIN 17730 2.4365	Monel, UNS N04400
		B166		Inconel 600, UNS N06600
Acero Forjado Forged Steel	Acero al Carbono Carbon Steel	A105	DIN 17243 1.0402 (C-22) DIN 17243 1.0460 (C-22.8)	WCB
		A182 F6a	DIN 17440 1.4021	
	Acero inoxidable Stainless Steel	A182 F304	DIN 17440 1.4301	CF8
		A182 F304L	EN-10088 1.4307	CF3
		A182 F316	DIN 17440 1.4401	CF8M
		A182 F316L	DIN 17440 1.4404	CF3M
		A182 F321	DIN 17440 1.4541	
		AISI 904L	SEW 400 1.4539	UNS N08904
			DIN 17445 1.4312	
			DIN 17440 1.4571	
	Acero al Carbono y Baja Aleación. Baja Temperatura Carbon & Low Alloy Steel. Low Temperature	A350 LF1		
		A350 LF2	SEW 081 1.0508	LCC
		A350 LF3		LC3



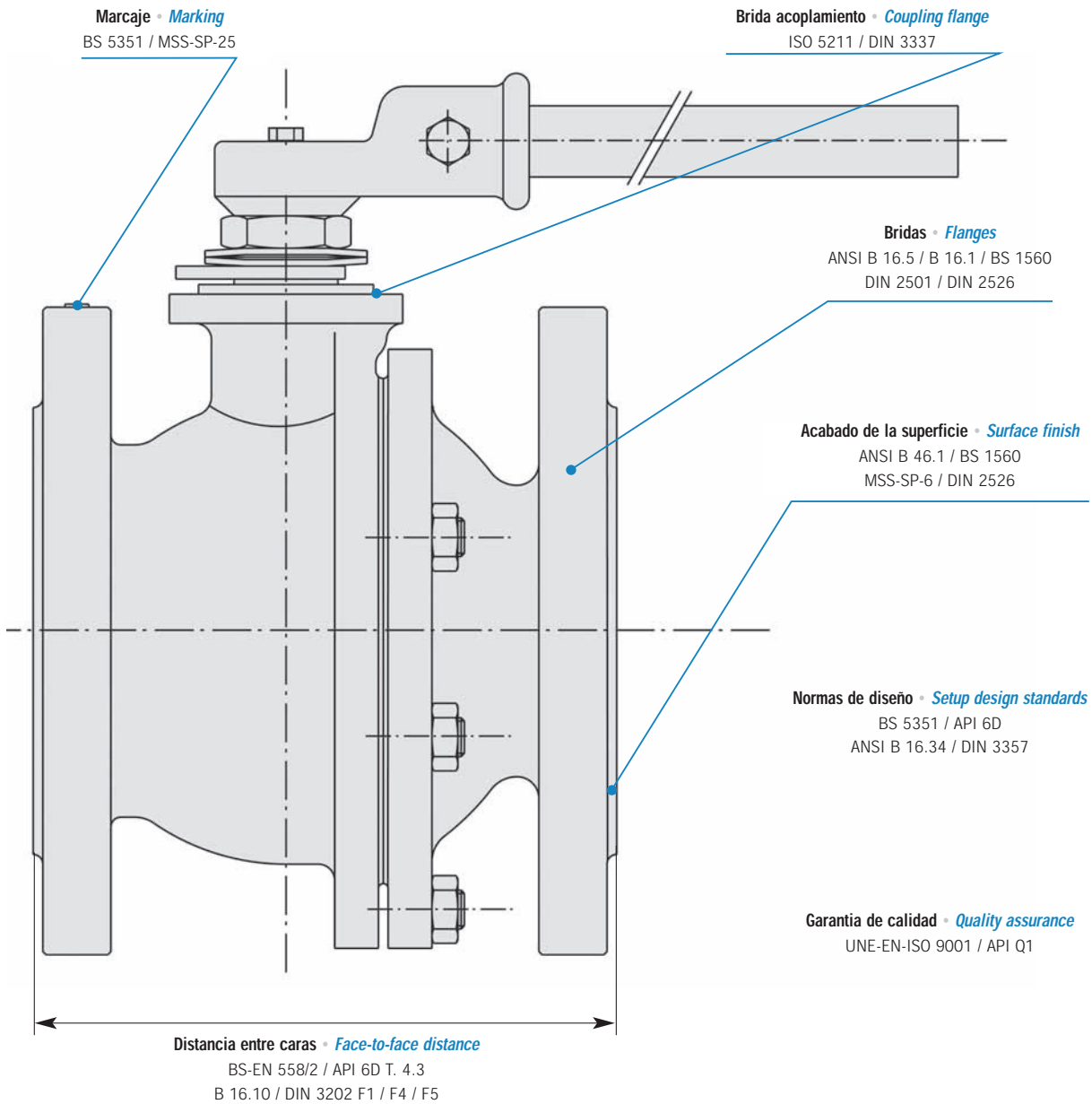
Propiedades de materiales / Material properties												
Tipo de material Material type	Propiedades químicas / Chemical properties								Propiedades mecánicas / Mechanical properties			
	%C max.	%Si max.	%Mn max.	%P max.	%S max.	%Cr	%Ni	%Mo	Misc	Límite de rotura Tensile strength (N/mm ²)	Límite elástico Yield strength (N/mm ²)	Elongación Elongation (%)
1.4408	0,07	1,50	1,50	0,045	0,03	18-20	10-12	2-3		440-640	185-210	20
1.4401	0,07	1,00	2,00	0,045	0,015	16,5-18,5	10-13	2-2,50	N≤0,11%	510-710	205-240	35
1.4308	0,07	2,0	1,50	0,045	0,03	18-20	9-11			440-640	175-200	20
1.4301	0,07	1,00	2,00	0,045	0,015	17-19,5	8-10,5		N≤0,11%	500-700	195-230	40
1.4404	0,03	1,00	2,00	0,045	0,015	16,5-18,5	10-13	2-2,5	N≤0,11%	490-690	190-225	35
1.4552	0,06	1,50	1,50	0,045	0,03	18-20	9-11		Nb≥8•%C	440-640	175-200	20
1.4306	0,03	1,00	2,00	0,045	0,015	18-20	10-12		N≤0,11%	460-680	180-215	40
1.0619	0,18-0,23	0,60	0,5-1,2	0,03	0,2					420-600	245	22
1.0460	0,18-0,23	0,40	0,4-0,9	0,035	0,03	0,30				410-540	230-250	23
1.4469	0,03	1,00	1,00	0,03	0,02	24-26	6-8	4-5	0,12≤N≤0,25	650-850	480	22
CF8M	0,08	1,50	1,50	0,04	0,04	18-21	9-12	2-3		485	205	30
316	0,08	1,00	2,00	0,045	0,03	16-18	10-14	2-3	N≤1%	515	205	30
CF8	0,08	2,00	1,5	0,04	0,04	18-21	8-11	0,5max.		485	205	35
304	0,08	1,00	2,00	0,045	0,03	18-20	8-11		N≤1%	515	205	30
CF8C	0,08	2,00	1,50	0,04	0,04	18-21	9-12	0,5max.	8•%C≤Nb≤1%	485	205	30
CF3	0,03	2,00	1,5	0,04	0,04	17-21	8-12	0,5max.		485	205	35
304L	0,035	1,00	2,00	0,045	0,03	18-20	8-13		N≤1%	485	170	30
CF3M	0,03	1,50	1,50	0,04	0,04	17-21	9-13	2-3		485	205	30
316L	0,08	1,00	2,00	0,045	0,03	16-18	10-15	2-3	N≤1%	485	170	30
CN7M	0,07	1,50	1,50	0,04	0,04	19-22	27,5-30,5	2-3	Cu = 3-4%	425	170	35
WCB	0,03	0,60	1,00	0,04	0,045	0,5max.	0,5max.	0,2max.	Cu≤0,3%,V≤0,03%	485-655	250	22
A105	0,35	0,1-0,35	0,6-1,05	0,035	0,04	0,3max.	0,4max.	0,12max.	Cu≤0,4%,V≤0,05%	485	250	30
LCC	0,25	0,60	1,20	0,04	0,045	0,50	0,50	0,2max.	V≤0,03%	485-655	275	22
LF2	0,30	0,15-0,3	0,6-1,35	0,035	0,04	0,3max.	0,4max.	0,12max.	Cu≤0,4%,V≤0,05%	485-655	250	22

Tabla de conversiones / Conversion chart			
Longitud / Length			
1 cm	= 0,39370		in
1 cm	= 0,03281		ft
1 in	= 25,4		mm
1 ft	= 0,3048		m
Volumen / Volume			
1 cm ³	= 0,06102		in ³
1 in ³	= 16,38706		cm ³
1 ft ³	= 0,02832		m ³
1 ft ³	= 28,31685		l
1 l	= 0,21997		gallon (U.K. liq.)
1 l	= 0,26417		gallon (U.S. liq.)
Masa y Densidad / Mass & Density			
1 g	= 0,035274		ounce
1 kg	= 2,20462		pound
1 kg/m ³	= 0,06243		pound/ft ³
1 kg/m ³	= 0,00835		pound/gallon (U.S.)
Par / Torque			
1 kg·m	= 9,80665		N·m
1 kg·m	= 7,23299		pound-ft
1 N·m	= 0,73756		pound-ft
Temperatura / Temperature			
°C	= (°F-32) / 1,8		
°F	= 1,8 °C + 32		
Misceláneas / Miscellaneous			
1 atm	= 760		mm Hg (32 °F)
1 atm	= 10330		mm H ₂ O (60 °F)
1 bar	= 750		torr
1 torr	= 13,59		mm H ₂ O
Área / Area			
1 cm ²	= 0,15500		in ²
1 cm ²	= 0,00108		ft ²
1 in ²	= 645,16		mm ²
1 ft ²	= 0,09290		m ²
Velocidad y Caudal / Speed & Flow			
1 cm/min	= 0,39307		in/min
1 ft ³ /min	= 28,31685		l/min
1 l/min	= 0,035315		ft ³ /min
Fuerza / Force			
1 dyna	= 0,00001		N
1 kgf	= 9,80665		N
Presión / Pressure			
1 atm	= 101325		Pa
1 atm	= 1,01325		bar
1 atm	= 1,0333		kg/cm ²
1 bar	= 14,50377		pound/in ²
1 N/m ²	= 0,000145		pound/in ²
1 Mpa	= 10		bar
1 p.s.i.	= 6985		Pa
Energía y Potencia / Energy & Power			
1 cal	= 4,19002		J
1 ft-pound	= 1,35582		J
1 kg·m	= 9,80665		J
1 ft-pound/hr	= 0,0003766		W
1 horsepower (elec)	= 746		W
pie / ft (foot)		pulgada / in (inch)	
litro / l (litre)		onza / ounce	
libra / pound		caloría / cal (calorie)	

Las tablas y datos mostrados en estas páginas, deben ser considerados como una guía. Para obtener una descripción más precisa se recomienda consultar las Normas apropiadas.

All tables and data shown in these pages are meant to be reference average values.

For a more accurate product description, we recommend that the related Standards be looked up.



Normas seguridad fuego • Fire safety standards

BS 6755 P.2 / API 607 (4th Ed. 1993)
API 6FA (2nd Ed. 1994)

Pruebas • Test

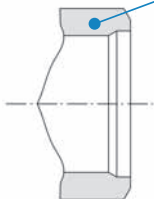
BS 6755 P.1 A / B 16.104 C1.VI
API 598 / DIN 3230 P.3

Especificación de material • Material specification

NACE MR0175-2000

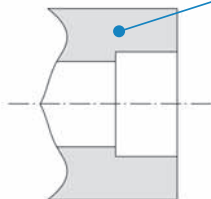
Soldadura a tope • Butt Welding

ANSI B 16.25 / ANSI B 36.10



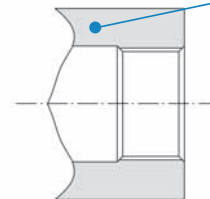
Soldadura por enchufe • Socket Welding

ANSI B 16.11



Conexión con rosca • Screwed connection

NPT - ANSI B1.20.1 / BSP - ISO228



Norma / Standard	Equivalencias de Presión / Pressure equivalences													
ANSI / ASME B 16.34			150 lbs			300 lbs	400 lbs	600 lbs	Serie 800	900 lbs		1500 lbs	2500 lbs	
PN / DIN 3357	PN10	PN16		PN25	PN40		PN63		PN100		PN160	PN250		
API 6A						API1000			API 1500	API 2000		API 3000	API 6000	
W.O.G.						1000 psi			1500 psi	2000 psi		3000 psi	6000 psi	
P max. (T amb.)	10 bar	16 bar	20 bar	25 bar	40 bar	50 bar	63 bar	69 bar	100 bar	138 bar	150 bar	160 bar	250 bar	420 bar

Pares de Maniobra • Torque Values

Los valores mostrados a lo largo de este catálogo, son una media orientativa del valor real, tomados en condiciones ideales de agua limpia, T ambiente, PTFE virgen, manipulación diaria y sin coef. de seguridad. Para diferentes tipos de servicios y condiciones, sugerimos los siguientes factores correctivos:

The values shown throughout this catalogue are an average of the real values. These values have been taken under ideal conditions of clean water, room temperature, unfilled PTFE, daily handling and without safety rate. For different types of services and conditions, we suggest that the following corrective factors be used:

Asientos de PTFE cargados	Filled PTFE seats	1,2 - 1,4
Baja temperatura (-50°C)	Low temperature (-50°C)	1,5
Baja temperatura (-100°C)	Low temperature (-100°C)	2
Larga inactividad	Long inactivity	2 (min.)
Gases no secos	Nondry gases	1,5
Gases secos (Gas Natural)	Dry gases (Natural Gas)	1,7
Polvo	Powder	1,3
Fluidos reseccantes	Drying-out fluids	1,2

Kv • Cv

Q (m³/h)	Caudal	Flow rate
Δp (bar)	Caida de presión	Pressure drop
δ (kg/m³)	Densidad	Densidad

$$K_v = Q \sqrt{\frac{\delta}{1000 \cdot \Delta p}} \quad \Delta p = \left(\frac{Q}{K_v}\right)^2 \cdot \left(\frac{\delta}{1000}\right) \quad 1Cv \approx 1,17Kv$$

CE

Carbono Equivalente / Carbon Equivalent

$$CE = C + \frac{Mn}{6} + \frac{Cr+Mo+V}{5} + \frac{Ni+Cu}{15}$$

NACE, MR0175

Requisitos de material metálico para resistencia a fisuración por tensión debido a la acción del sulfuro (SSC), para producción de petróleo, perforación, equipo colector y de suministro e instalaciones de procesamiento, a emplear en servicio hidrocarbonado conteniendo sulfuro de hidrógeno (H₂S).

Metallic material requirements for resistance to sulfide stress cracking (SSC) for petroleum production, drilling, gathering and flowline equipment, and field processing facilities to be used in hydrogen sulfide (H₂S)-bearing hydrocarbon service.

Codificación / Coding

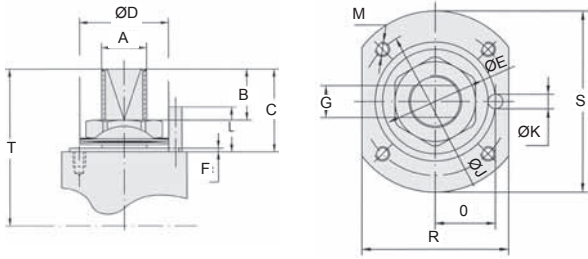
¿Cómo identificar el código de válvulas de KCE? • How to identify KCE valve coding?

Ejemplo / Example F14D, FB, DN50, PN40, RF, SS/SS, FSM														
COD.	—	4D	0	58	40	R	0	A000						
Descripción: Description:	Conjunto Assembly	Figura Figure	Paso/Longitud Port/Lenght	Tamaño Size		Presión Pressure	Conexión End connection	Material Material	Variante Special executions					
(1)	1A	F21A	0	FB	00	1/8"	08	04	PN-04	1	BW Sch.10	0	SS/SS	Define si hay ejecuciones particulares (FSM, Gas, extensiones, etc) It includes special executions like (FSM, Gas, extensions, etc)
	14	F14	1	RB	01	1/4"	10	06	PN-06	2	BW Sch.20	1	CS/316	
	8A	F18A	2	FB/Long	02	3/8"	15	10	PN-10	4	BW Sch.40	2	CS/420	
	19	VU19	3	FB/Long spec.	03	1/2"	20	16	PN-16	6	BW Sch.160	3	CI	
	2A	F26A	4	RB/Long	04	3/4"	25	20	PN-20	8	BW Sch.80	4	CS/304	
	2D	F26D	5	RB/Long spec.	05	1"	32	25	PN-25	A	ANSI	5	304/304	
	2H	HB-2			06	1 1/4"	40	32	PN-32	B	BSP	6	Low temp.	
	2L	F20L			07	1 1/2"	50	40	PN-40	C	NPT	7	SS Alloys	
	2T	F20T			08	2"	65	63	PN-63	D	Fondo/Bottom	8	CS Alloys	
	21	F21			09	2 1/2"	80	70	PN-70	E	ANSI Spe./DIN	9	Otros/Others	
	26	F26			10	3"	95	71	PN-100	F	FF			
	29	VU29			11	4"	100	72	PN-160	M	SW mm			
	3L	F13L			12	5"	125	A1	Ansi 150	N	NIPPLE			
	3T	F13T			13	6"	150	A3	Ansi 300	P	PE			
	3F	F3			14	8"	190	A6	Ansi 600	R	RF			
	4A	F14A			15	10"	200	A9	Ansi 900	S	SW Sch.			
	M4M	F14M			16	12"	250	AA	Ansi 1500	W	BW			
	4D	F14D			17	14"	300	C1	C100	X	BW Sch. XXX			
	T8T	F18T			18	16"	350	C3	C300					
	50	F50			19	18"	400	C6	C600					
	6A	BF6A			20	20"	450	C8	C800					
	6F	BF6			21	24"	500	C9	C900					
	6K	BF6K			71	600	CA	C1500						
	8H	HB					WO	1000 WOG						
	8S	SB-80					W1	1500 WOG						
							W3	3000 WOG						
							W6	6000 WOG						

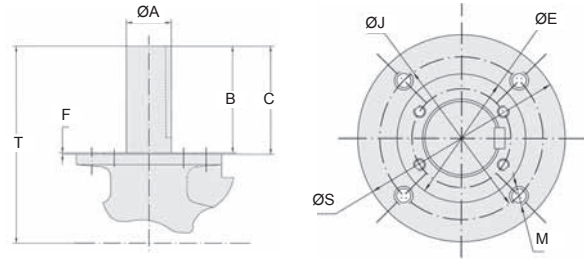
(1) Si es '0', indica que la válvula lleva accesorios incorporados (reductores, actuadores, etc.), sino es así, no se pone ningún dígito.
(1) If '0', it indicates that the valve is fitted with some accessories (gear boxes, actuators, etc.). Otherwise there is no digit.

ISO 5211 Dimensiones pletina superior / Coupling flange dimensions

F14D DN15-DN150
F14A NPS 1/2"-6"



F14D DN200-DN300
F14A NPS 8"-12"



F14D, F14A (PN 16/40) (A150/300)		DN-NPS	ISO5211 DIN3337	T	A	B min.	C	D	E	F	G	J	K	L	O	M	R	S
15	1/2"	F03		41,5	M10-1,5	9,5	18	20	25	1,5	6	36	7	13,5	14	M5	48	
20	3/4"			45,5		8	16,5											
25	1"			53		10	20,5											
32	1 1/4"	F05		84	M12-1,5	14,5	29	28	35	2	9	50				M6	65	
40	1 1/2"			90														
50	2"	F07		130	M24-2	25,5	46	50	55		19	70				M8	72	90
65	2 1/2"			140														
80	3"			150														
100	4"	F10		196	M36-2	40,5	66	71	70		22	102				M10	100	125
125				199														
150	6"			223 (F14D) 235 (F14A)														
200	8"	F14		284 (F14D) GB 368 (F14D) ACT 296,5 (F14A) GB 380,5 (F14A) ACT	Ø 50	42 GB 145,5 ACT	64,5 GB 148,5 ACT		100	3	30 GB 14 ACT	140				M16		175
250	10"			F14 (F14D) F16 (F14A)		321 (F14D) GB 405,5 (F14D) ACT 461 (F14A)	Ø 50 (F14D) Ø 50 (F14A)				42 (F14D) GB 145,5 (F14D) ACT 171,5 (F14A)							
300	12"	F16		475,5 (F14D) 490 (F14A)	Ø 65	171,5	174,5	130	130		18	165				M20		210

DN 200/250/300 - NPS 8"/10"/12": Dimensiones con Reductor (GB) o Actuador (ACT) /Dimensions with Gear Box (GB) or Actuator (ACT)

TABLA DE RESISTENCIA A LA CORROSION
CORROSION RESISTANCE TABLE

Fluido Medium	Materiales / Materials									Fórmula Formula
	Metálicos / Metallic						Elásticos / Soft			
	Estándar / Standard			Especial / Special			N	V	T	
A	CI	CS	SS	H.C	A.20	M	N	V	T	
Acetaldehyde	■	■	●●	*	*	*	▼	▼	●●	
Acetamine	●●	■	●	*	*	*	■	●	●●	
Acetat Solvent	●	●●	●●	*	*	*	▼	▼	●●	
Acetic Acid (10%)	▼	■	●●	●●	●●	●	▼	▼	●●	CH ₃ COOH
Acetic Acid (30%)	■	■	●●	●●	●●	●	▼	▼	●●	CH ₃ COOH
Acetic Acid (80%)	■	■	●●	●●	●●	●	▼	▼	●●	CH ₃ COOH
Acetic Acid (Aerated)	▼	▼	●●	*	*	*	■	▼	●●	CH ₃ COOH
Acetic Acid (Air free)	▼	▼	●●	●●	●●	●	■	▼	●●	CH ₃ COOH
Acetic Acid (Crude)	▼	■	●●	*	*	*	▼	▼	●●	CH ₃ COOH
Acetic Acid (Pure)	▼	▼	●●	*	*	*	▼	▼	●●	CH ₃ COOH
Acetic Acid (Vapor)	▼	▼	▼	●●	●●	●	▼	▼	●●	CH ₃ COOH
Acetic Anhydride	▼	▼	●	●●	●●	▼	▼	▼	●●	(CH ₃ CO) ₂ O
Acetone	●●	●●	●●	●●	●●	●●	▼	▼	●●	CH ₃ COCH ₃
Acetyl Chloride	*	■	■	*	■	●	▼	■	●●	
Acetylene (Dry)	●●	●●	●●	*	*	*	●	●●	●●	C ₂ H ₂
Acid Fume	*	▼	●	*	*	*	■	*	●●	
Acrylonitrile	■	●●	●●	*	*	*	▼	▼	●●	H ₂ C=CHCN
Air	●●	●●	●●	*	*	*	●●	●●	●●	78%N ₂ +21%O ₂ +0,8%Ar+...
Alcohol-Amyl	■	●	●●	*	*	*	●	●	●●	C ₅ H ₁₁ -OH
Alcohol-Buthyl	■	●	●●	●●	●●	●●	●	●●	●●	CH ₃ (CH ₂) ₂ CH ₂ OH
Alcohol-Diacetona	●●	●●	●●	*	*	*	▼	▼	●●	
Alcohol-Ethyl	●	●	●●	●●	●●	●●	●	●	●●	C ₂ H ₅ -OH
Alcohol-Fatty	*	●	●●	*	*	*	●	●	●●	
Alcohol-Isopropyl	●	●	●●	*	*	*	■	●●	●●	(CH ₃) ₂ CH-OH
Alcohol-Methyl	●	●	●●	●●	●●	●●	●	■	●●	CH ₃ -OH
Alcohol-Propyl	●	●	●●	●●	●●	●●	●	●	●●	CH ₃ -CH ₂ -CH ₂ -OH
Aliphatic Ester	*	*	*	*	*	*	▼	*	●●	
Alkyl Chloride	▼	▼	▼	*	*	*	▼	*	●●	
Alum	▼	▼	●●	*	●●	*	●	●	●●	KAl(SO ₄) ₂
Alumina	*	*	*	*	*	*	●●	*	●●	
Aluminum Acetate	▼	▼	●●	●●	●●	●	▼	▼	●●	(CH ₃ COO) ₃ Al
Aluminum Chloride (Dry)	*	■	■	*	*	*	●	●●	●●	AlCl ₃
Aluminum Chloride (Solu)	*	▼	■	●●	●●	●	●	●●	●●	AlCl ₃
Aluminum Fluoride	*	▼	■	●●	●●	●	●●	●●	●●	AlF ₃
Aluminum Hydroxide	*	▼	●●	*	●●	●	●●	●●	●●	
Aluminum Nitrate	▼	▼	●	*	*	*	●	▼	●●	
Aluminum Oxide	*	*	*	*	*	*	●●	*	●●	Al ₂ O ₃
Alum. Potassium Sulfate	▼	▼	●●	*	*	*	●	●	●●	
Aluminum Sulfate	▼	▼	●●	●●	●●	■	●	●●	●●	Al ₂ (SO ₄) ₃ ·18H ₂ O
Amine	■	●	●●	*	*	*	■	▼	●●	NH(C ₂ H ₅) ₂
Ammonia Anhydrous Liquide	●	●●	●●	●●	●●	●	■	▼	●●	
Ammonia (Aqueous)	●	●●	●●	*	*	*	●	■	●●	NH ₃
Ammonia Gas (Hot)	*	*	●●	*	*	*	■	▼	●●	NH ₃
Ammonia Liquor	*	*	●●	*	*	*	*	*	●●	
Ammonia Solution	●	●	●●	*	*	*	●	▼	●●	
Ammonium Acetate	●	●	●	*	*	*	●	●●	●●	
Ammonium Bicarbonate	●	■	●	*	●●	●	●	●●	●●	(NH ₄)HCO ₃
Ammonium Bromide (5%)	*	▼	●	●●	●●	●	*	*	●●	
Ammonium Carbonate	●	●	●	●●	●●	●●	■	●	●●	(NH ₄) ₂ CO ₃
Ammonium Chloride	▼	▼	■	●●	●●	●	●	●●	●●	NH ₄ Cl
Ammonium Hydroxide (28%)	■	■	●	●●	●●	▼	●	●	●●	NH ₄ OH
Ammonium Hydroxide (Conc.)	■	■	●	*	*	*	■	●	●●	NH ₄ OH
Ammonium Nitrate	▼	▼	●●	●●	●●	*	●●	●●	●●	NH ₄ NO ₃
Ammonium Oxalate (5%)	*	▼	●	●●	●●	●	*	*	●●	
Ammonium Persulfate	▼	▼	●●	●●	●●	▼	■	■	●●	
Ammonium Phosphate (Mono Basic)	▼	▼	●	●●	●●	●	●	●●	●●	
Ammonium Phosphate (Bi-Basic)	▼	▼	●	●●	●●	●	●●	●●	●●	(NH ₄) ₂ HPO ₄
Ammonium Phosphate (Tri-Basic)	▼	▼	●	●●	●●	●	●●	●●	●●	(NH ₄) ₃ PO ₄
Ammonium Sulfate	■	■	●	■	●●	●	●●	●	●●	(NH ₄) ₂ SO ₄
Ammonium Sulfide	▼	▼	●	*	*	*	●	■	●●	
Ammonium Sulfite	■	■	●●	*	●●	▼	●	●	●●	
Amyl Acetate	●	■	●●	●●	●●	●	▼	▼	●●	C ₅ H ₁₁ -O-CO-CH ₃
Amyl Alcohol	■	●	●●	*	*	*	●	●	●●	C ₅ H ₁₁ -OH

Nota / Note: ●● Excelente - Excelent ● Bueno - Good ■ Pobre - Poor ▼ Muy Pobre - Very Poor * Sin Datos - Data Unavailable

CI = Hierro Fundido / Cast Iron CS = Acero Carbono / Carbon Steel SS = Acero Inoxidable / Stainless Steel CF8M, 316 H.C = Hastelloy C A.20 = Alloy 20 M = Monel N = Nitrile V = Viton T = PTFE, Teflon

Fluido Medium	Materiales / Materials									Fórmula Formula
	Metálicos / Metallic						Elásticos / Soft			
	Estándar / Standard			Especial / Special			N	V	T	
Cl	CS	SS	H.C	A.20	M					
Amyl Chloride	●	●	●	●●	●●	●	●●	●●	●●	
Aniline	■	■	●	●●	●●	*	▼	■	●●	C ₆ H ₅ NH ₂
Aniline Dye	▼	■	●●	*	*	*	■	●	●●	
Animal Oil	●●	●●	●●	*	*	*	●●	●	●●	
Antimony Trichloride	▼	▼	▼	*	*	●	■	●●	●●	SbCl ₃
Apple Juice	▼	▼	●	*	*	*	●●	●●	●●	
Aqua Regia	▼	▼	▼	*	*	*	▼	▼	●●	
Aromatic Solvent	*	■	●●	*	*	*	▼	*	●●	
Arsenic Acid	▼	▼	●	*	*	*	●●	●●	●●	
Asphalt Emulsion	■	■	●●	*	*	*	▼	●●	●●	H ₃ AsO ₄
Asphalt Liquid	■	■	●●	*	*	*	▼	●●	●●	
B										
Barium Carbonate	●	●	●	●●	●●	●	●●	●●	●●	
Barium Chloride	■	■	●	*	●●	●	●●	●●	●●	BaCl ₂
Barium Cyanide	*	●	●	*	*	*	●	●	●●	
Barium Hydrate	*	*	●●	*	*	*	*	*	●●	
Barium Hydroxide	●	■	●	●●	●●	●	●●	●●	●●	Ba(OH) ₂ + 8H ₂ O
Barium Nitrate	*	■	●●	*	●●	*	●	*	●●	
Barium Sulfate	■	■	●	*	●●	●	●●	●●	●●	SO ₄ Ba
Barium Sulfide	■	■	●	*	*	*	●●	●●	●●	BaSO ₃
Beer	■	■	●●	●●	●●	●	■	●●	●●	
Beet Sugar Liquid	●	●	●●	*	*	*	●●	●●	●●	
Bentonite	●	*	●	*	*	*	●	●	●●	
Benzaldehyde	●	●●	●●	*	*	*	▼	▼	●●	C ₆ H ₅ CHO
Benzene	●	●	●	●●	●●	●	▼	●	●●	C ₆ H ₆
Benzoic Acid	▼	▼	●	●●	●●	●	●	●	●●	HC ₆ H ₅ - COO
Benzol	●	●	●	●●	●●	●	▼	●	●●	C ₆ H ₆
Beryllium Sulfate	*	*	●	*	*	*	●	●	●●	
Bitumen	■	■	●●	*	*	*	■	*	●●	
Black Liquor	■	■	●	*	*	*	■	■	●●	
Black Sulfate Liquor	■	■	●	*	*	*	■	■	●●	
Bleaching Powder (Wet)	*	*	●	●●	●	▼	▼	●	●●	
Blood	*	▼	●●	●●	●●	●●	●	●	●●	
Borax	*	■	●	●●	*	●	●	●●	●●	Na ₂ B ₄ O ₇ ·10H ₂ O
Borax Liquor	■	■	●	*	*	*	●	●●	●●	
Boric Acid	▼	▼	●	●●	●●	●	●●	●●	●●	H ₃ BO ₃
Brake Fluid	■	■	●	*	*	*	▼	▼	●●	
Brine (Saturated)	■	▼	●	*	*	*	●	●●	●●	NaCl
Bromine (Dry)	▼	▼	▼	●●	●●	▼	▼	●	●●	
Bromine (Wet)	▼	▼	▼	●●	●	▼	▼	●	●●	
Bunker Oil	●	●	●●	*	*	*	●	●●	●●	
Butadine	●	●	●●	*	*	*	■	●	●●	H ₂ C=CHHC=CH ₂
Butane	●	●	●●	*	*	*	●	●	●●	C ₄ H ₁₀
Butanol	■	●	●●	*	*	*	●	●●	●●	
Buttermilk	▼	▼	●●	●●	*	*	●●	●●	●●	
Butyl Acetate	●	●	●●	●●	●●	●	▼	▼	●●	CH ₃ COOC ₄ H ₉
Butyl Alcohol	■	●	●●	*	*	*	●	●●	●●	C ₄ H ₉ OH
Butyl Amine	●	●	●●	*	*	*	▼	▼	●●	
Butylene	●●	●●	●●	*	*	*	▼	■	●●	
Butyric Acid	▼	▼	●	●●	●●	*	■	■	●●	CH ₃ -(CH ₂) ₂ -COOH
C										
Calcium Bisulfite	▼	▼	●	*	*	*	●●	●●	●●	Ca(HSO ₃) ₂
Calcium Carbonate	▼	▼	●	●●	●●	●●	●●	●●	●●	CO ₃ Ca
Calcium Chlorate	*	■	●●	*	*	*	●	●	●●	
Calcium Chloride	■	■	●	●●	●●	●	●●	●●	●●	CaCl ₂
Calcium Hydroxide	■	■	●	●●	●●	●●	●	●●	●●	Ca(OH) ₂
Calcium Hypochloride	▼	▼	■	*	*	*	■	●●	●●	Ca(ClO) ₂
Calcium Nitrate	*	*	*	*	*	*	●	*	●●	
Calcium Phosphate	*	*	●	*	*	*	●	●	●●	
Calcium Silicate	*	*	●	*	*	*	●	●	●●	
Calcium Sulfate	■	■	●●	*	●●	●	●●	●●	●●	CaSO ₄
Camphor	*	*	●	●●	●●	*	●	●	●●	
Cane Sugar Liquor	●	●	●●	*	*	*	●	●	●●	
Carbolic Acid	▼	▼	●	*	*	*	▼	●	●●	
Carbon Bisulfide	●	●	●	*	●●	●	▼	●●	●●	CS ₂

Fluido Medium	Materiales / Materials									Fórmula Formula
	Metálicos / Metallic						Elásticos / Soft			
	Estándar / Standard			Especial / Special			N	V	T	
	CI	CS	SS	H.C	A.20	M				
Carbon Dioxide (Dry)	●	●●	●●	●●	●●	●●	■	●	●●	CO ₂
Carbon Dioxide (Wet)	■	■	●●	*	*	*	*	*	*	CO ₂
Carbon Monoxide	●	●	●●	*	*	*	●	●	●●	
Carbon Tetrachloride (Dry)	■	■	●●	●●	●●	●●	▼	●	●●	CCl ₄
Carbon Tetrachloride (Wet)	▼	▼	●	●●	●●	●●	▼	●	●●	CCl ₄
Carbonate Beverage	▼	▼	●	●●	●●	●	●	●●	●●	
Carbonated Water	*	●	●●	*	*	*	●●	●●	●●	
Carbonic Acid	▼	▼	●	●●	●●	●	●	●●	●●	
Casein	*	*	●	*	*	*	●	●	●●	
Castor Oil	●	●	●●	*	*	*	●●	●●	●●	
Catsup	▼	▼	●●	*	*	*	●●	●●	●●	
Caustic Potash (70%, Cold)	●	●●	●●	*	*	*	●	▼	●●	
Caustic Potash (70%, Hot)	●	●●	●●	*	*	*	●	▼	●●	
Caustic Potash (Dilute, Cold)	●	●●	●●	*	*	*	●●	▼	●●	
Caustic Potash (Dilute, Hot)	●	●	●●	*	*	*	●	▼	●●	
Caustic Soda (20%, Cold)	●●	●●	●●	*	*	*	●●	●	●●	
Caustic Soda (20%, Hot)	●	●	●●	*	*	*	●	■	●●	
Caustic Soda (50%, Cold)	●	●●	●●	*	*	*	●●	■	●●	
Caustic Soda (50%, Hot)	●	●	●●	*	*	*	●	■	●●	
Caustic Soda (70%, Cold)	●	●	●●	●●	●●	●●	●	■	●●	
Caustic Soda (70%, Hot)	■	●	●	●	●	●●	▼	■	●●	
Cellulose Acetate	●	●	●	*	*	*	▼	▼	●●	
China Wood Oil	■	■	●●	●●	●●	*	●●	●●	●●	
Chlorinated Solvent	■	■	●	*	*	*	▼	■	●●	
Chlorinated Water	*	*	■	*	*		●	●●	●●	
Chlorine (Dry)	■	■	●	●●	●●	●●	■	●	●●	Cl ₂
Chlorine (Wet)	▼	▼	▼	▼	▼	▼	▼	*	●●	Cl ₂
Chloroacetic Acid	▼	▼	▼	●●	▼	●	▼	■	●●	
Chlorobenzene (Dry)	●	●	●●	*	■	●●	▼	●●	●●	
Chloroform (Dry)	●	●	●●	●●	●●	●●	▼	●	●●	CHCl ₃
Chlorophyll (Dry)	●	*	●	*	*	*	●	●	●●	
Chlorosulfonic Acid (Dry)	●	●	●	●●	▼	●	▼	▼	●●	HOSO ₂ Cl
Chlorosulfonic Acid (Wet)	▼	▼	▼	*	*	*	▼	▼	●●	HOSO ₂ Cl
Chrome Alum	●	●	●●	*	*	*	●	●	●●	
Chromic Acid (<50%)	▼	▼	■	●●	▼	▼	▼	■	●●	H ₂ CrO ₄
Chromic Acid (>50%)	▼	▼	■	■	▼	▼	▼	■	●●	H ₂ CrO ₄
Chromium Sulfate	*	*	●	*	*	*	●	●	●●	
Cider	*	*	●	●●	●●	●●	●	●	●●	
Citric Acid	▼	▼	●●	●●	●●	*	●	●●	●●	(CH ₂ COOH) ₂ C(OH)COOH
Citrus Juice	▼	▼	●	*	*	*	●●	●●	●●	
Coca-Cola Syrup	*	*	●●	*	*	*	●	●	●●	
Coconut Oil	■	■	●	*	*	*	●●	●●	●●	
Coffe	*	■	●●	●●	●●	●	●●	●●	●●	C ₈ H ₁₀ N ₄ O ₄ H ₂ O
Coke Oven Gas	●●	●	●●	*	*	*	■	●	●●	
Cooking Oil	●	●	●●	*	*	*	●●	●●	●●	
Copper Acetate	▼	▼	●●	●●	●●	*	■	▼	●●	(CH ₃ COO) ₂ Cu
Copper Carbonate	*	*	●●	●●	●●	*	*	*	●●	
Copper Chloride	▼	▼	■	●●	*	▼	●	●●	●●	
Copper Cyanide	*	*	●●	●●	■	▼	●●	●●	●●	
Copper Nitrate	▼	▼	●	●●	●●	▼	●●	●●	●●	
Copper Sulfate	▼	▼	●	*	●●	■	●●	●●	●●	CuSO ₄
Corn Oil	▼	■	●	*	*	*	●●	●●	●●	
Cottonseed Oil	*	■	●	*	*	*	●●	●●	●●	
Creosote Oil	●	●	●	*	*	*	▼	●●	●●	
Cresol	*	■	●	*	*	*	▼	▼	●●	
Cresylic Acid	▼	■	●	*	*	*	▼	●	●●	CH ₃ OH
Crude Oil (Sour)	■	●	●●	*	*	*	●	●●	●●	
Crude Oil	●	●	●●	●●	●●	●	●●	●●	●●	
Cupric Nitrate	*	*	●●	●●	●●	▼	*	*	●●	
Cutting Oil (Water Emulsion)	●	●	●●	*	*	*	●●	●●	●●	
Cyanide Plating Solution	*	*	●	*	*	*	●	●	●●	
Cyclohexane	●●	●●	●●	*	*	*	■	●●	●●	
Cyclohexanone	*	*	*	*	*	*	▼	*	●●	

Nota / Note: ●● Excelente - Excelent ● Bueno - Good ■ Pobre - Poor ▼ Muy Pobre - Very Poor * Sin Datos - Data Unavailable
 CI = Hierro Fundido / Cast Iron CS = Acero Carbono / Carbon Steel SS = Acero Inoxidable / Stainless Steel CF8M, 316 H.C = Hastelloy C A.20 = Alloy 20 M = Monel N = Nitrile V = Viton T = PTFE, Teflon®

Fluido Medium	Materiales / Materials									Fórmula Formula
	Metálicos / Metallic						Elásticos / Soft			
	Estándar / Standard			Especial / Special			N	V	T	
Cl	CS	SS	H.C	A.20	M					
D										
Detergent (Synthetic)	●	●	●	*	*	*	●	●	●●	
Dextrin	*	*	●	*	*	*	●	●	●●	
Diacetone Alcohol	●●	●●	●●	*	*	*	▼	▼	●●	
Dichloroethane	*	*	■	*	*	*	▼	*	●●	(CH ₂ Cl) ₂
Dichloroethyl Ether	*	*	●	*	*	*	▼	▼	●●	
Dichloropentane	*	●●	●●	*	*	*	■	*	●●	
Diesel Oil	●	●●	●●	*	*	*	●	●●	●●	
Diethyl Sulfate	*	*	●	*	*	*	■	●	●●	
Diethylamine	●●	●●	●●	*	*	*	■	▼	●●	
Diethylene Glycol	●●	●●	●●	*	*	*	●●	●	●●	
Dioxane	●	●	●	*	*	*	*	▼	●●	
Dipentene	●●	●●	●●	*	*	*	●●	●	●●	
Distilled Water	▼	▼	●●	*	*	*	●	●●	●●	
Dowtherm	●	●	●●	*	*	*	▼	●●	●●	
Drilling Mud	●	●	●●	*	*	*	●●	●●	●●	
Dry Claning Fluid	●	●	●●	*	*	*	▼	●	●●	
Drying Oil	●	■	●	*	*	*	●●	●●	●●	
E										
Enamel	*	*	*	*	*	*	●	*	●●	
Epson Salt	■	■	●	*	*	*	●●	●●	●●	
Essential Oil	*	●	●	*	*	*	●	*	●●	
Ethane	●	●	●	*	*	*	●●	●●	●●	C ₂ H ₆
Ethanolamine	●	●	●●	*	*	*	●	■	●●	
Ether	●	●●	●●	●●	●●	●	▼	■	●●	
Ethyl Acetate	■	●	●	●●	●●	●●	▼	▼	●●	CH ₃ COOC ₂ H ₅
Ethyl Acrylate	■	■	●●	*	*	*	▼	▼	●●	CH ₂ =CHCOOC ₂ H ₅
Ethyl Alcohol	●	●	●●	*	*	*	●	●	●●	C ₂ H ₅ -OH
Ethyl Benzene	*	●●	●●	*	*	*	■	●	●●	
Ethyl Bromide	*	●	●	*	*	*	●	●	●●	
Ethyl Chloride (Dry)	●	●	●●	*	●●	●	■	●	●	
Ethyl Chloride (Wet)	▼	▼	●	*	●●	●	■	●	●●	
Ethyl Ether	■	■	●●	*	*	*	▼	▼	●●	C ₂ H ₅ OC ₂ H ₅
Ethyl Silicate	●	*	●	*	*	*	●	●	●●	
Ethylene	●●	●●	●●	*	*	*	●●	●●	●●	C ₂ H ₄
Ethylene Dichloride	*	*	●	*	*	*	▼	■	●●	
Ethylene Glycol	●	●	●	*	*	*	●●	●●	●●	C ₂ H ₄ (OH) ₂
Ethylene Oxide	▼	●	●	*	*	*	▼	▼	●●	C ₂ H ₄ O=CH ₂ -O-CH ₂
F										
Fatty Acid	▼	▼	●●	●●	●●	●	●	●●	●●	
Fatty Alcohol	*	●	●●	*	*	*	●	●	●●	
Ferric Chloride	▼	▼	▼	●●	▼	▼	●	●●	●●	FeCl ₃
Ferric Nitrate	▼	▼	■	●●	●●	▼	●	●●	●●	
Ferric Sulfate	▼	▼	●	●●	●●	▼	●●	●●	●●	
Ferrous Chloride	▼	▼	▼	●●	▼	▼	●	●●	●●	FeCl ₂
Ferrous Sulfate	*	▼	●	●●	●●	▼	■	●	●●	SO ₄ Fe+7H ₂ O
Fertilizer Solution	●	●	●	*	*	*	●	*	●●	
Fish Oil	●	●	●●	*	*	*	●●	●●	●●	
Flue Gas	●●	■	●●	●●	●	*	■	●	●●	
Fluoboric Acid	*	*	●●	*	*	*	●	*	●●	
Fluorine (Dry)	▼	▼	■	*	■	●●	●	■	●●	
Fluosillicic Acid	▼	▼	●	*	*	*	■	●	●●	
Food (Fluid & Paste)	■	■	●●	*	*	*	●	*	●●	
Formaldehyde (Cold)	●	●	●●	●●	●●	■	●	▼	●●	HCHO
Formaldehyde (Hot)	▼	▼	■	*	*	*	●	▼	●●	HCHO
Formic Acid (Cold)	▼	▼	●	●●	●●	●	■	●	●●	HCOOH
Formic Acid (Hot)	▼	▼	●	*	*	*	▼	●	●●	HCOOH
Freon, 11, MF, 112, BF	■	*	●●	*	*	*	■	▼	●●	
Freon, 12, 12, 32, 114, 115	●	●	●●	*	*	*	●	■	●●	
Freon, 21, 31	■	■	●●	*	*	*	▼	▼	●●	
Freon, 22	●	■	●●	*	*	*	▼	▼	●●	
Freon, 113 TF	■	*	●●	*	*	*	●	■	●●	
Freon Gas (Dry)	■	●	●●	*	*	*	●	■	●●	
Freon Gas (Wet)	*	*	■	*	*	*	●	▼	●●	
Fresh Water	■	■	●●	*	*	*	●	●●	●●	

Fluido Medium	Materiales / Materials									Fórmula Formula
	Metálicos / Metallic						Elásticos / Soft			
	Estándar / Standard			Especial / Special			N	V	T	
CI	CS	SS	H.C	A.20	M					
Fruit Juice	●	●	●●	●●	●●	●	●●	●●	●●	
Fuel Oil	●	●	●●	●●	●●	●	●●	●●	●●	
Fuel RP-1	●●	●●	●●	*	*	*	●	●●	●●	
Furfural	●	●●	●●	●●	●●	●	▼	▼	●●	
G										
Gallic Acid (5%)	▼	●	●	●●	●●	*	●	●●	●●	
Gas (Manufactured)	●	●	●	*	*	*	●●	●●	●●	
Gas (Natural)	●	●●	●●	*	*	*	●	●●	●●	
Gas Odorizer	●	●	●	*	*	*	●	●●	●●	
Gasoline (Aviation)	●	●●	●●	*	*	*	■	●●	●●	
Gasoline (Leaded)	●●	●●	●●	*	*	*	■	●●	●●	
Gasoline (Motor)	●	●●	●●	*	*	*	■	●●	●●	
Gasoline (Refined)	●	●	●●	*	*	*	■	●●	●●	
Gasoline (Sour)	●	●	●●	*	*	*	■	●	●●	
Gasoline (Unleaded)	●	●●	●●	*	*	*	■	●●	●●	
Gelatine	▼	▼	●●	*	*	*	●●	●●	●●	CH ₂ -NH ₂ -COOH
Glucose	●	●	●●	*	*	*	●●	●●	●●	CH ₂ OH-(CHOH) ₄ -COH
Glue	●●	●●	●●	●●	●●	*	●●	●●	●●	
Glycerine	●	●	●●	●●	●●	●	●●	●●	●●	(CH ₂ OH) ₂ CHOH
Glycerol	●	●	●●	*	*	*	●●	●●	●●	
Glycol	●	●	●	*	*	*	●	●●	●●	HO-CH ₂ -CH ₂ -OH
Alycol Amine	*	*	●	*	*	*	▼	▼	●●	
Glyoxal	*	▼	●	*	*	*	▼	▼	●●	
Graphite	*	*	●	*	*	*	●	●	●●	
Grease	●●	●●	●●	*	*	*	●●	●●	●●	
Green Liquor	■	■	●	*	*	*	■	■	●●	
Green Sulfate Liquor	■	■	●	*	*	*	■	■	●●	
H										
Hard Water	*	●	●●	*	*	*	●	*	●●	
Helium Gas	●	*	●	*	*	*	●	●	●●	
Heptane	●	●	●●	*	*	*	●●	●●	●●	
Hexamethylenetetramine	*	●	●●	*	*	*	*	*	●●	
Hexamine	*	●	●●	*	*	*	*	*	●●	
Hexane	●	●	●	*	*	*	●●	●●	●●	
Hexanol	●	■	●●	*	*	*	▼	●●	●●	
Hexanol (Tertiary)	●●	●●	●●	*	*	*	●●	●	●●	
Hexanol (Secondary)	*	●	●	*	*	*	*	*	●●	
Hexyl Alcohol	●	■	●●	*	*	*	▼	●●	●●	
Hydraulic Oil (Petroleum Base)	●	●●	●●	*	*	*	●●	●●	●●	
Hydraulic Oil (Phosphate Base)	*	●●	●●	*	*	*	▼	●●	●●	
Hydraulic Oil (Synthetic Base)	*	●●	●●	*	*	*	▼	■	●●	
Hydrazine	*	*	●	*	*	*	●	▼	●●	
Hydrazine (Hydrate)	*	*	●	*	*	*	■	▼	●●	
Hydrobromic Acid	▼	▼	▼	■	▼	▼	■	●●	●●	
Hydrochloric Acid	▼	▼	▼	*	▼	*	■	●●	●●	HCl
Hydrocyanic Acid	■	■	●●	●●	●●	●	●	●●	●●	
Hydrofluoric Acid	▼	▼	▼	●●	▼	●	▼	▼	●	
Hydrofluosilicic Acid	▼	▼	▼	●●	●●	●	●	●●	●●	H ₂ SF ₆
Hydrogen Gas (Cold)	●	●	●●	*	*	*	●	●●	●●	H ₂
Hydrogen Gas (Hot)	*	●	●	*	*	*	●	●●	●●	H ₂
Hydrogen Peroxide (Concentrated)	▼	▼	●	●●	●●	*	▼	●	●●	H ₂ O ₂
Hydrogen Peroxide (Dilute)	▼	▼	●	●●	●●	*	●●	●●	●●	H ₂ O ₂
Hydrogen Sulfide (Dry)	●	●	●●	●●	●●	●	■	●	●●	H ₂ S
Hydrogen Sulfide (Wet)	▼	■	●	●●	●●	●	■	●	●●	H ₂ S
Hypo	■	▼	●●	*	*	*	●●	●●	●●	
Hypochlorous Acid	▼	▼	■	*	*	*	●	▼	●●	
I										
Illuminating Gas	●●	●●	●●	*	*	*	●	●●	●●	
Ink (Newsprint)	▼	▼	●●	●●	●●	●	●	●●	●●	
Iodine (Wet)	▼	▼	▼	●●	▼	▼	●	●●	●●	
Iodoform	■	●	●●	*	*	*	*	●●	●●	

Nota / Note: ●● Excelente - Excelent ● Bueno - Good ■ Pobre - Poor ▼ Muy Pobre - Very Poor * Sin Datos - Data Unavailable

CI = Hierro Fundido / Cast Iron CS = Acero Carbono / Carbon Steel SS = Acero Inoxidable / Stainless Steel CF8M, 316 H.C = Hastelloy C A.20 = Alloy 20 M = Monel N = Nitrile V = Viton® T = PTFE, Teflon®

Fluido <i>Medium</i>	Materiales / <i>Materials</i>									Fórmula <i>Formula</i>
	Metálicos / <i>Metallic</i>						Elásticos / <i>Soft</i>			
	Estándar / <i>Standard</i>			Especial / <i>Special</i>			N	V	T	
	CI	CS	SS	H.C	A.20	M				
Isobutane	*	*	•	*	*	*	•	••	••	
Isooctane	•	••	••	*	*	*	•	••	••	
Isopropyl Acetate	*	*	•	*	*	*	▼	▼	••	
Isopropyl Alcohol	•	•	••	*	*	*	■	••	••	(CH ₃) ₂ CH-OH
Isopropyl Ether	•	••	••	*	*	*	■	▼	••	
J										
Jet Fuel	••	••	••	*	*	*	•	••	••	
JP-4 Fuel	•	••	••	*	*	*	•	••	••	
JP-5 Fuel	••	••	••	*	*	*	•	••	••	
JP-6 Fuel	••	••	••	*	*	*	••	••	••	
K										
Kerosene	•	•	••	••	••	•	••	••	••	
Ketchup	▼	▼	••	••	••	•	••	••	••	
Ketone	••	••	••	*	*	*	▼	▼	••	
L										
Lacquer Solvent	■	■	••	*	*	*	▼	▼	••	
Lactic Acid (Concentrated, Cold)	▼	▼	••	••	••	*	•	••	••	
Lactic Acid (Concentrated, Hot)	▼	▼	•	••	••	*	■	•	••	CH ₃ -CH ₂ -OH-(OOH)
Lactid Acid (Dilute, Cold)	▼	▼	••	••	••	*	•	••	••	
Lactic Acid (Dilute, Hot)	▼	▼	•	••	••	*	■	■	••	
Lactose	*	*	•	*	*	*	•	•	••	
Lard	*	*	••	••	••	*	•	•	••	
Lard Oil	■	■	•	*	*	*	••	••	••	
Lead Acetate	▼	▼	•	••	••	•	•	•	••	Pb(CH ₃ COO) ₂
Lead Sulfate	*	*	•	*	*	*	•	•	••	
Lecithin	*	*	•	*	*	*	▼	•	••	
Lemon Juice	▼	▼	•	*	*	*	••	••	••	
Lime	*	•	*	*	*	*	•	*	••	
Lime (Slurry)	*	•	•	*	*	*	•	•	••	
Lime Mixture	*	*	••	*	*	*	••	*	••	
Linilic Acid	•	•	••	*	*	*	•	•	••	
Linseed Oil	••	••	••	••	••	•	••	••	••	
Lithium Chloride	*	•	•	*	*	*	•	•	••	
LPG	▼	•	•	*	*	*	••	••	••	
Lubricating Oil (Petroleum Base)	••	••	••	*	*	*	••	••	••	
Lubricating Oil (Synthetic Base)	••	••	••	*	*	*	■	■	••	
M										
Magnesium Bisulfate	•	•	••	*	*	*	•	•	••	
Magnesium Bisulfide	▼	*	•	*	*	*	•	•	••	
Magnesium Carbonate	•	•	••	••	••	•	•	•	••	
Magnesium Chloride	▼	■	•	••	••	•	•	••	••	
Magnesium Hydroxide (Cold)	•	•	••	••	••	••	•	••	••	
Magnesium Hydroxide (Hot)	•	•	••	••	••	••	•	••	••	
Magnesium Nitrate	*	*	••	••	••	*	•	•	••	
Magnesium Sulfate	•	•	••	••	••	••	••	••	••	MgSO ₄
Maleic Acid	■	•	•	*	*	*	•	••	••	C ₄ H ₄ O ₂ =CO ₂ H-CH ₂ -CH-CO ₂ H
Maleic Anhydride	*	*	•	*	*	*	▼	•	••	
Malic Acid	▼	▼	•	••	••	•	••	••	••	CO ₂ H-CH(OH)-CH ₂ CO ₂ H
Malt Beverage	*	*	••	*	*	*	••	••	••	
Manganese Carbonate	*	*	•	*	••	•	•	*	••	
Manganese Chloride	▼	▼	•	*	■	•	••	••	••	
Manganese Sulfate	*	*	•	*	*	*	•	•	••	
Mannitol Solution	*	*	•	*	*	*	*	*	••	
Mayonnaise	▼	▼	••	••	*	•	••	••	••	
Meat Juice	*	*	••	••	••	*	•	*	••	
Melamine Resin	*	*	■	*	*	*	•	*	••	
Menthol	•	•	•	*	*	*	•	•	••	
Mercaptane	*	•	•	*	*	*	▼	••	••	
Mercuric Chloride	▼	▼	■	▼	*	*	•	••	••	HgCl ₂
Mercuric Cyanide	▼	▼	••	*	*	*	•	•	••	
Mercuric Nitrate	▼	▼	•	*	*	*	*	*	••	Hg(NO ₃) ₂
Mercurous Nitrate	*	*	••	••	••	*	■	•	••	
Mercury	••	••	••	••	••	•	••	••	••	Hg

Fluido Medium	Materiales / Materials									Fórmula Formula
	Metálicos / Metallic						Elásticos / Soft			
	Estándar / Standard			Especial / Special			N	V	T	
	CI	CS	SS	H.C	A.20	M	N	V	T	
Mercury Salt	▼	▼	*	*	*	*	●	●●	●●	Na ₂ HPO ₄ +12H ₂ O
Methane	●	●	●	*	*	*	●●	●●	●●	
Methanol	●	●	●●	*	*	*	●	■	●●	CH ₃ - CO ₂ - CH ₃
Methyl Acetate	●	●	●●	*	*	*	▼	▼	●●	
Methyl Acetone	●●	●●	●●	*	*	*	▼	▼	●●	
Methyl Alcohol	●	●	●●	*	*	*	●	■	●●	CH ₃ OH
Methyl Amine	●	●	●●	*	*	*	▼	▼	●●	CH ₃ NH ₂
Methyl Bromine (100%)	*	*	●	*	*	*	■	■	●●	
Methyl Cellosolve	●	●	●●	*	*	*	▼	▼	●●	
Methyl Cellulose	*	*	●●	*	*	*	▼	*	●●	
Methyl Chloride	●	●	●●	*	*	*	▼	●	●●	CH ₃ Cl
Methyl Ethyl Ketone	●	●●	●●	*	*	*	▼	▼	●●	
Methyl Formate	■	■	●	*	*	*	▼	▼	●●	
Methyl Isobutyl Ketone	*	*	●	*	*	*	▼	*	●●	
Methylene Chloride	●	●	●●	●●	●●	●	▼	■	●●	CH ₂ Cl ₂
Milk	▼	▼	●●	●●	*	*	●●	●●	●●	
Milk (Cow)	▼	▼	●●	*	*	*	●●	●●	●●	
Milk Product	▼	▼	●●	*	*	*	●●	●●	●●	
Mine Water (Acid)	*	▼	●●	●●	●●	▼	●	●●	●●	
Mineral Oil	●	●	●●	*	*	*	●●	●●	●●	
Mineral Spirit	●	●	●	*	*	*	●●	●●	●●	
Mixed Acid (Cold)	■	■	●	*	*	*	▼	●●	●●	
Molasses (Crude)	●●	●●	●●	●●	*	●●	●●	●●	●●	
Molasses (Edible)	■	■	●●	*	*	*	●●	●●	●●	
Molybdic Acid	*	▼	●●	●●	●●	*	*	*	●●	
Monochloro Benzene (Dry)	*	*	●	*	*	*	▼	*	●●	
Monochloroacetic	*	*	■	*	*	*	■	*	●●	
Morpholine	●	*	●	*	*	*	▼	▼	●●	
Mustard	●	●	●●	●●	*	●	●●	●●	●●	
N										
Naphta	●	●	●	*	*	*	●	●●	●●	
Naphthalene	●	●	●	*	*	*	▼	●●	●●	C ₁₀ H ₈
Natural Gas	●	●●	●●	*	*	*	●	●●	●●	
Natural Gas (Sour)	*	●	■	*	*	*	●●	●●	■	
Nickel Ammonium Sulfate	▼	▼	●●	*	*	*	●●	▼	●●	
Nickel Chloride	▼	▼	●	●●	●●	●	●	●●	●●	NiCl ₂
Nickel Nitrate	▼	▼	●	●●	●●	▼	●●	●●	●●	Ni(NO ₃) ₂ +6H ₂ O
Nickel Sulfate	▼	▼	●	●●	●●	●	●●	●●	●●	NiSO ₄
Nicotinic Acid	●	●	●●	*	*	*	▼	●	●●	C ₆ H ₅ O ₂ N
Nitric Acid	▼	▼	●●	●●	●●	▼	▼	●	●●	HNO ₃
Nitric Acid (10%)	▼	▼	●●	●●	●●	▼	▼	●●	●●	HNO ₃
Nitric Acid (30%)	▼	▼	●●	●●	●●	▼	▼	●●	●●	HNO ₃
Nitric Acid (80%)	▼	▼	●	●●	●●	*	▼	●	●●	HNO ₃
Nitric Acid (100%)	▼	▼	●	●●	●●	*	▼	●	●●	HNO ₃
Nitric Acid (Anhydrous)	▼	■	●	*	*	*	▼	●	●●	
Nitrobenzene	●	●	●●	*	*	*	▼	■	●●	C ₆ H ₅ -NO ₂
Nitrogen	●●	●●	●●	*	*	*	●●	●●	●●	N ₂
Nitrous Acid (10%)	▼	▼	●	*	●●	*	■	●●	●●	N ₂ O ₃
Nitrous Gas	■	●	●●	*	*	*	●	●●	●●	
Nitrous Oxide	■	●	●	●●	●●	▼	●	●●	●●	N ₂ O
0										
Oil (Animal)	●●	●●	●●	*	*	*	●●	●	●●	
Oil (Cottonseed)	■	■	●	*	*	*	●●	●●	●●	
Oil (Essential)	*	●	●	*	*	*	●	*	●●	
Oil & Fat	*	●	●	*	*	*	●	●	●●	
Oil (Fish)	●	●	●●	*	*	*	●●	●●	●●	
Oil (Fuel)	●	●	●●	*	*	*	●●	●●	●●	
Oil (Lube)	●●	●●	●●	*	*	*	●●	●●	●●	
Oil (Mineral)	●	●	●●	●●	●●	●	●●	●●	●●	
Oil (Petroleum, Refined)	●	●●	●●	*	*	*	●●	●●	●●	
Oil (Petroleum, Sour)	■	●	●●	*	*	*	●	●●	●●	
Oil (Water Mixture)	●	●	●●	*	*	*	●	●●	●●	

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Fluido Medium	Materiales / Materials									Fórmula Formula
	Metálicos / Metallic						Elásticos / Soft			
	Estándar / Standard			Especial / Special			N	V	T	
Cl	CS	SS	H.C	A.20	M					
Oleic Acid	■	■	●	●	●	●	●	●	●	C ₁₇ H ₃₃ COOH
Oleum	▼	●	●	*	*	*	▼	●	●	
Olive Oil	●	●	●	*	*	*	●	●	●	
Oxalic Acid	■	▼	●	●	●	●	■	●	●	COOHCOOH
Oxigen (Cold)	●	●	●	*	*	*	●	●	●	O ₂
Oxigen (Hot)	*	●	●	*	*	*	▼	*	▼	O ₂
Ozone (Dry)	●	●	●	*	*	*	▼	●	●	O ₃
Ozone (Wet)	■	■	●	*	*	*	▼	●	●	
P										
Paint & Solvent	●	●	●	*	*	*	▼	●	●	
PalM Oil	■	■	●	*	*	*	●	●	●	
Palmitic Acid	■	■	●	*	*	*	●	●	●	CH ₃ -(CH ₂) ₁₄ -(CO ₂ H)
Paper Pulp	●	*	●	*	*	*	●	●	*	
Paraffin	●	●	●	●	●	●	●	●	●	
Paraformaldehyde	●	●	●	*	*	*	●	●	●	
Pentane	●	●	●	*	*	*	●	●	●	C ₅ H ₁₂
Perchlorethylene	●	●	●	*	*	*	■	●	●	
Petrolatum	■	■	●	*	*	*	●	●	●	
Petroleum Oil (Crude)	■	●	●	*	*	*	●	●	●	
Petroleum Oil (High Aniline)	■	■	●	*	*	*	●	●	●	
Petroleum Oil (Low Aniline)	●	■	●	*	*	*	●	●	●	
Petroleum Oil (Refined)	●	●	*	*	*	*	●	●	●	
Phenol	▼	▼	●	●	●	●	▼	●	●	C ₆ H ₅ OH
Phosphate Ester (10%)	●	●	●	*	*	*	▼	*	●	
Phosphoric Acid (10%, Cold)	▼	▼	●	●	●	●	●	●	●	H ₃ PO ₄
Phosphoric Acid (10%, Hot)	▼	▼	▼	*	*	*	●	●	●	H ₃ PO ₄
Phosphoric Acid (50%, Cold)	▼	▼	●	*	*	*	●	●	●	H ₃ PO ₄
Phosphoric Acid (50%, Hot)	▼	▼	▼	*	*	*	●	●	●	H ₃ PO ₄
Phosphoric Acid (80%, Cold)	*	■	●	*	*	*	■	●	●	H ₃ PO ₄
Phosphoric Acid (80%, Hot)	*	■	●	*	*	*	■	●	●	H ₃ PO ₄
Phosphoric Acid (100%)	*	*	●	*	*	*	▼	*	*	H ₃ PO ₄
Phosphorus Pentoxide	*	●	●	*	●	*	▼	●	●	
Phosphorus Trichloride	▼	▼	●	●	●	*	▼	●	●	
Photographic Solution	▼	*	●	*	*	*	■	●	●	
Phthalic Acid	■	■	●	*	*	*	■	●	●	
Phthalic Anhydride	■	■	●	*	*	*	■	●	●	
Picric Acid	▼	▼	●	●	●	●	■	●	●	(NO ₂) ₃ OH
Pine Oil	●	●	●	*	*	*	●	●	●	
Pineapple Juice	■	■	●	*	*	*	●	●	●	
Pinene	●	●	●	*	*	*	●	●	●	
Pitch (Roof)	●	●	●	*	*	*	●	●	●	
Polysulfide Liquor	●	*	●	*	*	*	●	●	●	
Polyvinyl Acetate	*	*	●	*	*	*	■	*	●	
Polyvinyl Chloride	*	*	●	*	*	*	*	*	●	
Potassium Alum	▼	▼	●	●	●	●	●	●	●	
Potassium Bicarbonate	*	*	●	*	*	*	●	*	●	
Potassium Bisulfate	*	*	●	*	*	*	●	●	●	
Potassium Bisulfite	▼	▼	●	*	*	*	●	●	●	
Potassium Bromide	▼	▼	●	●	●	●	●	●	●	
Potassium Carbonate	●	●	●	●	●	●	●	●	●	K ₂ CO ₃
Potassium Chlorate	●	●	●	●	●	●	●	●	●	KClO ₃
Potassium Chloride	●	■	■	●	●	●	●	●	●	KCl
Potassium Chromate	●	●	●	*	*	*	●	●	●	
Potassium Cyanide	●	●	●	●	●	●	●	●	●	KCN
Potassium Dichromate	■	■	●	●	●	*	●	●	●	K ₂ Cr ₂ O ₇
Potassium Diphosphate	●	●	●	*	*	*	●	●	●	
Potassium Ferricyanide	■	■	●	●	●	●	●	●	●	K ₃ Fe(CN) ₆
Potassium Ferrocyanide	■	■	●	●	●	●	●	●	●	K ₄ Fe(CN) ₆
Potassium Hydroxide (Dilute, Cold)	●	●	●	●	●	●	●	▼	●	KOH
Potassium Hydroxide (Dilute, Hot)	●	●	●	●	●	●	●	▼	●	KOH
Potassium Hydroxide (70%, Cold)	●	●	●	●	●	●	●	▼	●	KOH
Potassium Hydroxide (70%, Hot)	●	●	●	●	●	●	●	▼	●	KOH
Potassium Iodide	■	■	●	●	●	●	●	●	●	KJ
Potassium Nitrate	●	●	●	●	●	●	●	●	●	KNO ₃
Potassium Oxalate	*	*	●	●	●	*	*	*	●	
Potassium Permanganate	●	●	●	*	*	*	●	●	●	KMnO ₄

Fluido Medium	Materiales / Materials									Fórmula Formula
	Metálicos / Metallic						Elásticos / Soft			
	Estándar / Standard			Especial / Special			N	V	T	
	CI	CS	SS	H.C	A.20	M	N	V	T	
Potassium Phosphate	*	*	•	*	*	*	•	••	••	
Potassium Phosphate (Di-Basic)	*	••	••	*	*	*	••	••	••	
Potassium Phosphate (Tri-Basic)	*	••	•	*	*	*	•	••	••	
Potassium Sulfate	■	•	••	*	••	•	••	••	••	K ₂ SO ₄
Potassium Sulfide	•	•	••	*	••	*	••	•	••	K ₂ S
Potassium Sulfite	•	•	•	*	*	*	•	•	••	K ₂ SO ₃ +2H ₂ O
Potassium Triphosphate	*	••	••	*	*	*	•	*	••	
Producer Gas	•	•	•	*	*	*	•	••	••	
Propane Gas	•	•	••	*	*	*	••	••	••	C ₃ H ₈
Propyl Alcohol	•	•	••	*	*	*	•	•	••	CH ₃ -CH ₂ -CH ₂ OH
Propyl Bromide	*	•	•	*	*	*	•	•	••	
Propylene Glycol	•	•	•	*	*	*	••	••	••	
Pyridine	*	*	•	*	*	*	▼	▼	••	
Pyrogalllic Acid	•	•	•	••	••	*	•	••	••	OH-OH-OH=H ₃ O ₃
Pyrogallol	•	•	•	*	*	*	•	••	••	
Pyroigneous Acid	*	*	••	*	*	*	▼	▼	••	
Pyrosulfuric Acid. Oleum	▼	•	•	*	*	*	▼	•	••	
Q										
Quenching Oil	•	•	••	*	*	*	••	••	••	
Quinine Bisulfate (Dry)	*	*	••	••	••	•	•	•	••	
Quinine Sulfate (Dry)	*	*	••	••	••	•	•	•	••	
R										
Resin	■	■	••	••	••	*	■	••	••	
Road Tar	••	••	••	*	*	*	•	••	••	
Roof Pitch	••	••	••	*	*	*	•	••	••	
Rosin	■	■	••	••	••	*	■	••	••	
Rosin Emulsion	■	■	••	*	*	*	▼	•	••	
Rubber Latex Emulsion	*	•	••	*	*	*	*	••	••	
Rubber Solvent	••	••	••	*	*	*	▼	▼	••	
S										
Salad Oil	■	■	•	*	*	*	••	••	••	
Salicylic Acid	▼	▼	••	••	••	•	•	••	••	C ₆ H ₄ OHCOOH
Salt Brine	•	*	•	••	••	•	•	•	••	
Salt (NaCl)	■	■	•	••	••	••	••	••	••	NaCl
Sea Water	■	▼	•	••	••	•	••	••	••	
Sewage	•	■	•	*	*	*	••	•	••	
Shellac (Bleached)	•	••	••	*	*	*	•	▼	••	
Shellac (Orange)	•	••	••	*	*	*	••	*	••	
Silicon (Fluid)	•	•	•	*	*	*	•	•	••	
Silver Bromide	*	▼	••	••	••	•	*	*	••	
Silver Cyanide	▼	*	••	••	••	•	•	•	••	
Silver Nitrate	▼	▼	•	•	••	*	■	••	••	AgNO ₃
Silver Plating Solution	*	*	••	*	*	*	*	*	••	
Soap Solution	•	••	••	••	••	•	••	••	••	
Soda Ash	•	•	••	*	*	*	••	••	••	
Sodium Acetate	•	■	•	••	••	•	•	•	••	NaC ₂ -H ₃ O ₂ +3H ₂ O
Sodium Aluminate	■	■	•	*	*	*	••	••	••	NaAlO ₂
Sodium Bicarbonate	*	■	•	••	••	••	••	••	••	NaHCO ₃
Sodium Bisulfate (10%)	▼	▼	••	••	••	•	••	••	••	NaHSO ₄
Sodium Bisulfite (10%)	▼	▼	••	*	*	*	••	••	••	NaHSO ₃
Sodium Borate	*	■	•	••	••	•	•	••	••	NaBO ₂
Sodium Bromide (10%)	*	■	•	••	••	•	•	••	••	
Sodium Carbonate	•	•	••	••	••	••	••	••	••	Na ₂ CO ₃
Sodium Chlorate	■	■	•	••	••	*	•	••	••	ClO ₃ Na
Sodium Chloride	■	■	•	*	*	*	••	••	••	NaCl
Sodium Chromate	•	•	••	*	*	*	••	••	••	NaCrO ₄ +10H ₂ O
Sodium Citrate	*	*	••	••	••	*	*	*	••	
Sodium Cyanide	•	•	•	*	*	*	••	••	••	
Sodium Dichromate	*	•	••	••	••	*	▼	*	••	
Sodium Fluoride	▼	▼	•	••	*	•	••	••	••	NaF
Sodium Hydroxide (20%, Cold)	••	••	••	*	*	*	••	•	••	NaOH

Nota / Note: •• Excelente - Excelent • Bueno - Good ■ Pobre - Poor ▼ Muy Pobre - Very Poor * Sin Datos - Data Unavailable

CI = Hierro Fundido / Cast Iron CS = Acero Carbono / Carbon Steel SS = Acero Inoxidable / Stainless Steel CF8M, 316 H.C = Hastelloy C A.20 = Alloy 20 M = Monel N = Nitrile V = Viton® T = PTFE, Teflon®