Fluoropolymer Tubing Variations

TL/TIL/TLM/TILM/TH/TIH/TD/TID Series



KQ2

KQB2

KM

KF

M

H/DL

L/LL KC

KK

KK130

DM

KDM

KB

KR

KA KOG2 KG KFG2 MS KKA KP L₀ MQR

P.509

High Purity Fluoropolymer Tubing TL/TIL Series (Material Super PFA

It is suitable for applications which require a highly smooth internal surface and small amount of elution of fluorine ions. * It has heat and chemical resistance equivalent to PFA.

Flame resistant (Equivalent to UL-94 Standard V-0)

- Compatible with the Food Sanitation Law Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959
- · Complies with FDA (Food and Drug Administration) §177.1550 dissolution test

Fluoropolymer Tubing (PFA)

TLM/TILM Series

Material PFA

The material consists of a good chemical resistant fluoropolymer. This also has good heat resistance, and it is suitable for a wide range of applications.

Flame resistant (Equivalent to UL-94 Standard V-0)

Compatible with the Food Sanitation Law . Compatible with the test conforming to the Food Sanitation Law based on the

. Complies with FDA (Food and Drug Administration) §177.1550 dissolution



370th notice given by the Ministry of Health and Welfare in 1959.

FEP Tubing (Fluoropolymer)

TH/TIH Series



This has better resistance in chemical environments.

Flame resistant (Equivalent to UL-94 Standard V-0)

Compatible with the Food Sanitation Law · Compatible with the test con-

forming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.

· Complies with FDA (Food and Drug Administration) §177.1550 dissolution test



TD/TID Series (Material) Modified PTFE Flexibility improved by approx. 20% (Compared with SMC TL/TIL Series)

Soft Fluoropolymer Tubing

Suitable for applications which require flexibility.

Flame resistant (Equivalent to UL-94 Standard V-0) Compatible with the Food Sanitation Law

· Compatible with the test conforming to the Food Sanitation Law based on the 370th

notice given by the Ministry of Health and Welfare in 1959. · Complies with FDA (Food and Drug Administration)

§177.1550 dissolution test.

Series		es	TL/TIL	TLM/TILM	TH/TIH	TD/TID
Material			Super PFA	PFA	FEP	Modified PTFE
Chemical resistance		ance	0	0	0	0
Heat re	esistance		260°C	260°C	200°C	260°C
Flexibil	lity		Δ	Δ	Δ	0
Ion elu	tion		0	0	0	0
Internal smoothness		ness	0	Δ	9	0
Fluid			Chemicals, Deionized water	Chemicals, Deionized water	Air, Water	, Inert gas
Tubina	0.0	Metric	ø4 to ø19	ø2 to ø25	ø4 to ø12	ø4 to ø12
Tubing	O.D.	Inch	1/8" to 1"	1/8" to 1 1/4"	1/8" to 3/4"	1/8" to 1/2"
Color			Translucent	Translucent, Red, Blue, Black	Translucent, Red, Blue, Black	Translucent
e e	Φ One-touch fittings		KQ2, KQG2, KQB2, KP, KP□	KQ2, KQG2, KQB2, KP, KP□	KQ2, KQG2, KQB2, KP, KP□	_
seri	One-touch fittings Miniature fittings Insert fittings Fluoropolymer fittings		M, MS (Hose nipple type)	M, MS (Hose nipple type)	M, MS (Hose nipple type)	M, MS (Hose nipple type)
Insert fittings		ings	KF, KFG2	KF, KFG2	KF, KFG2	KF, KFG2
Fluoropolymer fittings		lymer fittings	LQ series	LQ series	LQ series	LQ series

○: Very good ○: Good △: Moderate

The comparison table shown above was prepared based on a relative comparison taking the characteristics of each fluoropolymer tubing into consideration.



However, this product is packaged regularly, not in double packaging





High Purity Fluoropolymer Tubing TL/TIL Series

Material: Super PFA

Flame resistant (Equivalent to UL-94 Standard V-0) Compatible with the Food Sanitation Law

- · Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given
- by the Ministry of Health and Welfare in 1959. · Complies with FDA (Food and Drug Administration) §177,1550 dissolution test

Series and Specifications Metric sizes (TL series) Inch sizes (TIL series) Tubing model TL0403 TL0604 TL0806 TL1008 TL1210 TL1916 TIL01 TILB01 TIL05 TIL07 TIL11 TIL13 TIL19 Nominal diameter 1/8" 1/8" 3/16' 1/4" 3/8" 1/2" 3/4" **Tubing size** Ø4 x Ø3 Ø6 x Ø4 Ø8 x Ø6 Ø10 x Ø8 Ø12 x Ø10 Ø19 x Ø16 1/8" x 0.086" 1/8" x 1/16" 3/16" x 1/8 1/4" x 5/32" 3/8" x 1/4" 1/2" x 3/8" 3/4" x 5/8" 1" x 7/8' Basic diamete 10 12 19 3 18 3.18 4.75 6.35 9.53 12 7 19.05 25.4 OΡ 8 (mm) Tolerance ± 0.1 Basic diameter 0.5 1.5 0.5 0.8 0.8 1 2 1.6 Thickness (mm) ±0.05 ±0.15 ±0.05 ±0.08 ±0.12 ±0.15 Tolerance ±0.1 ±0.08 10 m 20 m 50 m • • Bundle 100 m 16 m (50 ft) 33 m (100 ft)

Straight pipe 2 m Translucent (color of material) Applicable fluid Refer to the applicable fluid in page 511

Fluoropolymer Fittings LQ series: One-touch fittings KQ2, KQB2, KQB2, Clean One-touch fittings KP, KP□ Applicable fittings

	•		Insert fittings KF, KFG2, Miniature fittings M, MS (Hose nipple type)												
Max.	20°C or less	1.0	1.0	1.0	0.9	0.7	0.6	1.0	1.0	1.0	1.0	1.0	1.0	0.7	0.5
operating	100°C	0.45	0.64	0.43	0.33	0.27	0.24	0.59	0.92	0.62	0.73	0.62	0.43	0.26	0.19
pressure	200°C	0.21	0.29	0.20	0.15	0.12	0.11	0.27	0.42	0.28	0.34	0.28	0.20	0.12	0.09
(MPa)	260°C	0.09	0.12	0.08	0.06	0.05	0.05	0.11	0.17	0.12	0.14	0.12	0.08	0.05	0.04
Burst pressur	re (MPa at 20°C)	4.9	6.9	4.7	3.6	2.9	2.6	6.4	9.9	6.7	7.9	6.7	4.6	2.8	2.0
Min. bending	Recommended radius	35	35	60	100	130	220	20	10	25	35	60	95	220	400
radius (mm)	Tube close bend radius	20	20	40	65	110	160	12	6	20	20	30	60	160	290
Operating tempe	rature (fixed usage)		−65 to 260°C												
Material		Super PFA													

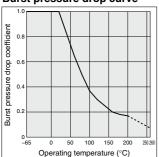
Note 1) When using the product at a temperature other than those shown in the table above, use it at a maximum operating pressure or less that is calculated from the following formula. (Max. operating pressure) = 1/4 x (burst pressure drop coefficient) x (burst pressure at 20°C).

Note 2) When using a fluid in liquid from, the surge pressure must be no more than the maximum operating pressure. A surge pressure higher than the maximum operating pressure can cause breakage of the fitting or bursting of the tubing. Furthermore, abnormal temperature rise caused by addiabatic compression may result in the tube bursting.

Note 3) Do not use this flooduct in a maximum or which the tube is not flexed. Deserve the resource along the tubing and fitting. A makerial change over a long duration or due to high-temperature may cause leakage. Perform periodic maintenance and replace with a new product immediately when abnormalities are detected. (Pieter to Maintenance' of the thorp precautions or maps 6.14), pages 1.01 or 1.01 me, when the continue the continue that is the continue to the continue that is the continue to the continue that is the continue that the tube is not not the that the tube is not be that the tube is not be that the tube is not not the trained to perform the continue that the tube is not the that the tube is not the that the tube is not the that the tube is not not the trained the continue that the tube is not the table is not the that the tube is not the that the tube shown above does not apply to the straight pipe (2 m)

Note 5) As for other commercial items, there are some cases it is not able to connect due to tolerance of dimensions Note 6) Fluid varies depending on the applicable fittings.

Burst pressure drop curve

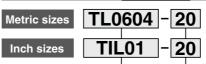


Eluting fluorine ion amount Note 7) Type Fluorine ion Eluting amount 0.1 or less

A 15 g piece of fluororesin tubing is cut off, washed in DI water (puer water) and immersed in 15 mL of 25% methyl alcohol extract at room temperature for 24 hours Then the extract is diluted with DI water (puer water) to be subjected to a quantitative analysis of fluorine ions

© 502

How to Order



Tubing Model

Length Applicable to both metric and inch size

How to measure the minimum bending radius At a temperature of 20°C, bend the tubing into a U shape. Fix one end and gradually move the other end closer. Measure 2R at the point where the outside diameter's rate of

change is 5%.

Symbol	Type	Length
10		10 m
20	Roll	20 m
50	HOII	50 m
100		100 m
2S	Straight	2 m

Length Applicable to inch size only

Symbol	Type	Length
16	Roll	16 m (50 ft)
33	Holi	33 m (100 ft)

Please refer to the "Series and Specifications" above, as the tubing length differs depending on each size.

The interior of the fluororesin tubing is washed with super deionized water Approximately 20 g of super high purity hydrofluoric acid (48%) is measured and injected into the tubing. The interior wall of the tubing is immersed at normal temperature for one week with both ends of the tubing plugged. Then the extract was diluted with super deionized water to be subjected to Note 7) Figures shown in tables are representative a quantitative analysis on Al. Fe. Ni. Na and Ca by the stripping method. values, not guaranteed values

13



Eluting metal ion amount Note 7)

ΑI Fe Ni Na Ca

4.5 0.3 0.2 7.1

Type

Eluting amount

Fluoropolymer Tubing (PFA)

TLM/TILM Series

(RoHS)

Max. operating temperature: 260°C

22 size variations

Metric size

Ø2 to Ø25 (13 sizes)

Length per roll 10 m, 20 m, 50 m, 100 m

Straight

Inch size

1/8" to 1 1/4" (9 sizes)

10 m, 20 m, 50 m, 100 m Length per roll 16 m (50 ft), 33 m (100 ft)

Straight

color variations

Translucent Black (Opaque) Blue (Translucent) Red (Translucent) **Applications**

Photovoltaic LCD HDD cell manufacturing manufacturing manufacturing

Medical

Food

Compatible with **Food Sanitation Law**

· Compatible with the test conforming to Japan's Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.

· Complies with FDA (Food and Drug Administration) §177.1550 dissolution test.

KQB2

KQ2

ΚM

KF

M H/DL L/LL

KC

KK KK130

DM

KDM

KB

KR KA

KOG2

KG KFG2

MS

KKA

KΡ LO

MQR



Fluoropolymer Tubing (PFA)

Metric Size

TLM Series

Flame resistant (Equivalent to UL-94 Standard V-0) Compatible with the Food Sanitation Law

- . Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.
- . Complies with FDA (Food and Drug Administration) §177,1550 dissolution test.

O.D. 3.2 mm is available in ø 1/8 inch (3.18 mm) tubing.

For details, refer to the table "Series" on page 505.

	0															
		ize								Metric size						
Model				TLM0201	TLM0302	TLM0425	TLM0403	TLM0604	TLM0806	TLM1075	TLM1008	TLM1209	TLM1210	TLM1613	TLM1916	TLM2522
	Tubin	g size		ø2 x ø1	ø3 x ø2	ø4 x ø2.5	ø4 x ø3	ø6 x ø4	ø8 x ø6	ø10 x ø7.5	ø10 x ø8	ø12 x ø9	ø12 x ø10	ø16 x ø13	ø19 x ø16	ø25 x ø22
	O.D.	(mm)		2	3	4	4	6	8	10	10	12	12	16	19	25
	I.D.	(mm)		1	2	2.5	3	4	6	7.5	8	9	10	13	16	22
Length	per roll	Color	Symbol	1												
	10 m	Translucent	N							•	•	•	•	•	•	
		Translucent	N	•	•	•	•	•	•	•	•	•	•	•	•	•
	20 m	Red (Translucent)	R	•	•	•	•	•	•	•	•	•	•	•	•	•
Roll		Blue (Translucent)		•	•	•	•	•	•	•	•	•	•	•	•	•
		Black (Opaque)	В	•	•	•	•	•	•	•	•	•	•	•	•	•
		Translucent		•	•	•	•	•	•	•	•	•	•	•	•	•
		Translucent		•	•	•	•	•	•	•	•	•	•	•	•	
Straight	2 m	Translucent	N	•	•	•	•	•	•	•	•	•	•	•	•	•
		•										•	•		•	

Specifications

Sarias

Specifica	เมษาธ													
Fluid Note 1) 2) 3)	and	Fluid: Re	efer to "Ap	plicable Fl	uid List" o	n page 512	2. Fitting	s: Fluorop	olymer fitti	ngs LQ se	eries			
applicable fitti	Fluid: Ai	Fluid: Air, Water, Inert gas Fittings: One-touch fittings KQ2, KQB2, KQB2, Clean One-touch fittings KP, KP□												
applicable little	ilga						Insert	fittings KF	, KFG2, M	iniature fit	tings M, M	S (Hose n	pple type))
Max. operating	pressure (MPa)					Refer t	o the max	the max. operating pressure curve.						
	Recommended radius	10	20	20	35	35	60	95	100	100	130	160	220	400
radius (mm) Note 4)	Tube close bend radius	7	15	15	20	20	40	60	65	65	110	130	160	290
Operating temper	rature (fixed usage)	e) Air, Inert gas: -65 to 260°C Water: 0 to 100°C (No freezing)												
Material		PFA (Tetrafluoroethylene perfluoroalkoxy vinyl ether conolymer)												

Inch O.D. size

5/16

Inch O.D. size

5/32

Note 1) Fluid varies depending on the applicable fittings.

Note 2) When using a liquid fluid, the surge pressure must not exceed the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tube bursting.

Note 3) Do not use this product in a manner in which the tube is not fixed. Observe the lesser value of the maximum operating pressure between the tubing and fitting. A material change over a long duration or due to high-temperature may cause leakage. Perform periodic maintenance and replace with a new product immediately when abnormalities are detected. (Refer to "Maintenance" of the tubing precautions on page 514.)

For other precautions, refer to "Fittings & Tubing Precautions" on pages 13 to 17. When using the fluoropolymer fittings, refer to the precautions on pages 445 and 446.

**Use a Minimum bending radius is measured as shown left as representative values.

**Use a tube above the recommended minimum bending radius.

- Use a tube above the recommended minimum bending radius.
 The tube may be bent if used under the recommended minimum bending radius. Therefore, refer to the tube close
- bend radius and make sure that the tube is not bent or flattened.
- · Please note that the tube close bend radius is not warranted because of the value when 2R is measured by the method in the right figure if the tube is bent or flattened, etc.

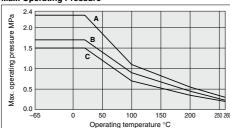
 • The minimum bending radius shown above does not apply to the straight pipe (2 m)

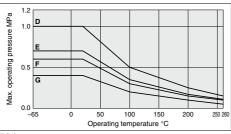
How to measure the minimum bending radius



At a temperature of 20°C, bend the tubing into a U shape. Fix one end and gradually move the other end closer. Measure 2R at the point where the outside diameter's rate of change is 5%.

Max. Operating Pressure





Group	Model	Ma	Max. operating pressure (MPa)							
Споир		20°C or less	100°C	200°C	260°C					
Α	TLM0201	2.3	1.1	0.55	0.3					
В	TLM0425	1.7	0.9	0.45	0.23					
С	TLM0302	1.5	0.7	0.35	0.2					
"	TLM0604	1.5	0.7	0.35	0.2					
	TLM0403									
D	TLM0806		0.5	0.25	0.15					
"	TLM1075	'		0.25	0.15					
	TLM1209									
Е	TLM1008	0.7	0.05	0.17	0.44					
=	TLM1613	0.7	0.35	0.17	0.11					
F	TLM1210	0.6	0.0	0.15	0.1					
"	TLM1916		0.3	0.15	0.1					
G	TLM2522	0.4	0.2	0.1	0.05					

How to Order



Tubing 4 designation Color indication

Symbol	Color
N	Translucent (Material color)
R	Red (Translucent)
BU	Blue (Translucent)
В	Black (Opaque)

ymbol	Type	Length
10		10 m
20	D-II	20 m
50	Roll	50 m
100		100

Lenath per roll

Note) Refer to the table "Series" above, as the tubing length differs depending on each size.

Straight 2 m



KQ2 KQB2

KM KF

L/LL KC

KK

KK130 DM **KDM**

KB

KR

KA

KQG2

KG

KFG2

MS

KKA

KP

LO

MQR

IDK

Fluoropolymer Tubing (PFA)

Inch Size TILM Series

Flame resistant (Equivalent to UL-94 Standard V-0) Compatible with the Food Sanitation Law

- . Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959. . Complies with FDA (Food and Drug
- Administration) §177.1550 dissolution test

	Si	ze					Inch size				
	Mo	idel	TILM01	TILMB01	TILM05	TILM07	TILM11	TILM13	TILM19	TILM25	TILM32
	Tubin	g size	1/8" x 0.086"	1/8" x 1/16"	3/16" x 1/8"	1/4" x 5/32"	3/8" x 1/4"	1/2" x 3/8"	3/4" x 5/8"	1" x 7/8"	11/4" x 11/10"
O.D.		inch	1/8"	1/8"	3/16"	1/4"	3/8"	1/2"	3/4"	1"	11/4"
	J.D.	mm	3.	18	4.75	6.35	9.53	12.7	19.05	25.4	31.75
	I.D.	inch	0.086"	1/16"	1/8"	5/32"	1/4"	3/8"	5/8"	7/8"	11/10"
	i.D.	mm	2.18	1.58	3.15	3.95	6.33	9.5	15.85	22.2	27.95
Lengt	h per roll	Color Symbo	ı l								
	10 m	Translucent N			•		•	•	•	•	
		Translucent N	•	•	•	•	•	•	•	•	•
	00	Red (Translucent) R	•	•	•	•	•	•	•	•	•
	20 m	Blue (Translucent) BU	•	•	•	•	•	•	•	•	•
Roll		Black (Opaque) B	•	•	•	•	•	•	•	•	•
	50 m	Translucent N	•		•	•	•	•	•	•	•
	100 m	Translucent N	•		•	•	•	•	•		
	16 m (50 ft)	Translucent N	•	•	•	•	•	•	•	•	•
		Translucent N	•	•	•	•	•	•	•	•	•
Straight	2 m	Translucent N	•		•	•	•	•	•	•	•
			Metric C	D.D. size]		O.D. 5/	32" is available	in ø4 metric tubi	ing, and O.D. 5/	16" is available

Specifications

Series

Specifica	uons											
Fluid Note 1) 2) 3)		Fluid: Refer t	Fluid: Refer to "Applicable Fluid List" on page 512. Fittings: Fluoropolymer fittings LQ series									
applicable fittir		Fluid: Air, Wa	Fluid: Air, Water, Inert gas Fittings: One-touch fittings KQ2, KQG2, KQB2, Insert fittings KFG2									
Max. operating	pressure (MPa)		Refer to the max. operating pressure curve.									
	Recommended radius	20	10	25	35	60	95	220	400	500		
radius (mm) Note 4)	Tube close bend radius	12	12 6 20 20 30 60 160 290 360									
Operating temper	ature (fixed usage)	Air, Inert gas: -65 to 260°C Water: 0 to 100°C (No freezing)										
Material	PFA (Tetrafluoroethylene perfluoroalkoxy vinyl ether copolymer)											

Note 1) Fluid varies depending on the applicable fittings.

Note 2) When using a liquid fluid, the surge pressure must not exceed the maximum operating pressure. If the surge pressure

Note 2) When using a liquid fluid, the surge pressure must not exceed the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubes. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tube bursting.

Note 3) Do not use this product in a manner in which the tube is not fixed. Observe the lesser value of the maximum operating pressure between the tube and fitting. A material change over a long duration or due to high-temperature may cause leakage. Perform periodic maintenance and replace with a new product immediately when abnormalities are detected. (Refer to "Maintenance" of the tubing precautions on page 514.)

For other precautions, refer to "Fittings & Tubing Precautions" on pages 13 to 17. When using the fluoropolymer fittings, refer to the precautions on pages 445 and 446.

Note 4) Minimum bending radius is measured as shown left as representative values.

- Note 4) Minimum bending radius is measured as shown left as representative values.

 Use a tube above the recommended minimum bending radius.

 The tube may be bent if used under the recommended minimum bending radius. Therefore, refer to the tube close bend radius and make sure that the tube is not bent or flattened.

 • Please note that the tube close bend radius is not warranted because of the value when 2R is measured by the method
 - in the right figure if the tube is bent or flattened, etc.

 - The minimum bending radius shown above does not apply to the straight pipe (2 m).

32

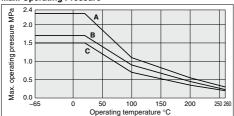
How to measure the minimum bending radius

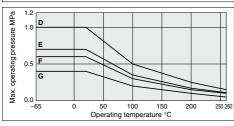


in ø8 metric tubing. For details, refer to the table "Series" on page 504.

At a temperature of 20°C, bend the at a temperature of 20 G, berto the tubing into a U shape. Fix one end and gradually move the other end closer. Measure 2R at the point where the outside diameter's rate of change is 5%.

Max. O	perating	Pressure
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Group	Model	Max. operating pressure (MPa)								
Споир	IVIOGEI	20°C or less	100°C	200°C	260°C					
Α	TILMB01	2.3	1.1	0.55	0.3					
В	TILM07	1.7	0.9	0.45	0.23					
С	TILM05	1.5	0.7	0.35	0.2					
"	TILM11	1.5	0.7	0.35	0.2					
D	TILM01		0.5	0.05	0.15					
"	TILM13	'	0.5	0.25	0.15					
F	TILM19	0.6	0.3	0.15	0.1					
G	TILM25	0.4	0.2	0.1	0.05					
G	TILM32	0.4	0.2	0.1	0.05					

How to Order

Inch size TILM01 Length per roll

aesi	designation						
С	olor indication						
Symbol	Color						
N	Translucent (Material color)						
R	Red (Translucent)						
BU	Blue (Translucent)						

Black (Opaque)

Symbol	Type	Length		
10		10 m		
20		20 m		
50	Boll	50 m		
100	Holi	100 m		
16		16 m (50 ft)		
33		33 m (100 ft)		
2S	Straight	2 m		
Note) Ref	er to the table "	Series" above, as		

the tubing length differs depending on each size.

505 ®

FEP Tubing (Fluoropolymer) Metric Size

TH Series





Operating Temperature: Max. 200°C It varies depending on the operating pressure. Refer to the graph for the maximum operating pressure.

Compatible with the Food Sanitation Law

- . Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.
- · Complies with FDA (Food and Drug Administration) §177.1550 dissolution test.

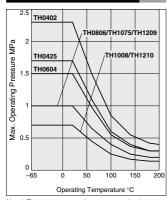
Flame Resistant (Equivalent to UL-94 Standard V-0)

How to measure the minimum bending radius.



At a temperature of 20°C, bend the tubing into a U shape. Fix one end and gradually move the other end closer. Measure 2R at the point where the outside diameter's rate of change is 5%.

Max. Operating Pressure



Note) The maximum operating pressure varies dependant on the I.D. bore size even if the O.D. is the same. € 506

Series							●-20 m	roll □-1	100 m roll
					Metri	c size			
Model		TH0402	TH0425	TH0604	TH0806	TH1075	TH1008	TH1209	TH1210
Tubing O.D.	(mm)	4	4	6	8	10	10	12	12
Tubing I.D.	(mm)	2	2.5	4	6	7.5	8	9	10
Color	Symbol								
Translucent	N		— ♦	─ ┡	─ •	- •		─ •	─ •
Red (Translucent)	R	├	-	-	-	- -	-	-	- -
Blue (Translucent)	BU	-lack	—♦—						
Black (Opaque)	В	-lack	—♦—						——
			minal size	In	ch nominal s	ize			

Specifica	tione		32	J L	5/16				- 1	
Specifica	liulia									
Fluid				Air,	Water No	^{te 1)} , Iner	t gas			
Applicable Note 2) One-touch fittings, Insert fittings Note Fluoropolymer fittings: LQ series Note Miniature fittings: M, MS series (Hos							pple type	e)		
	20°C or less	2.3	1.7	1.5		1	0.7	1	0.	7
Max. operating		0.85	0.6	0.55	0	0.4		0.4	0.2	25
pressure (MPa	200°C	0.4	0.3	0.3	0.2		0.1	0.2	0.	1
			Refer t	o the ma	k. operat	ing press	sure curv	e.		
Min. bending Re radius	commended dius	15	20	35	60	95	10	00	13	30
(mm) Note 5) Tube close bend radius		10	15	20	40	60	6	i5	11	0
Operating temperatur	e (fixed usage)	(Ixed usage) Air, Inert gas: -65 to 200°C Water: 0 to 100°C (No freezing))		
Material	Material FEP (Fluorinated Ethylene Propylene Resin)									
Note 1) When	uning a flui	d in liquid f	om the our		must not ove	and the me	imum anara	tina propo	.ro A o	uraa

Note 1) When using a fluid in liquid form, the surge pressure must not exceed the maximum operating pressure. A surge pressure higher than the maximum operating pressure can cause breakage of the fittings, or rupture of the tubing. Furthermore, an abnormal temperature increase due to adiabatic compression can also result in ruptured tubing.

Note 2) Do not use in locations where the FEP tubing will move. Be sure to operate under the maximum operating pressure conditions using the lower maximum operating specification of either the tubing or fittings.

After long term use or under high temperatures, some fittings leakage may occur due to material deterioration with age. Perform periodic inspections, and if any leakage is detected, replace with a new product immediately. When the insert and miniature fittings are used over extended periods of time, it may cause leakage due to the material deterioration of age. In such a case, give an additional tightening to the tube connection part. If leakage still occurs after giving an additional tightening, replace the fitting with a new product. For other precautions, refer to "Fittings & Tubing Precautions". When using the fluoropolymer fittings, refer to the precautions on pages 445 and 446. Select the size after confirming O.D. and I.D.

Note 3) As leakage may occur with the KFG2 series if the fluid is repeatedly heated and cooled or if there is a sudden change in the ambient temperature, we recommend considering the TD series.

Note 4) TH0402, TH0425, TH1075 and TH1209 are not available because of different internal diameters.

Note 5) The minimum bending radius is the representative value measured as shown in the left figure.

. Use a tube above the recommended minimum bending radius.

- . The tubing may be bent if used under the recommended minimum bending radius. Therefore, refer to the tube close bend radius and make sure that the tubing is not bent or flattened
- . Please note that the tube close bend radius is not warranted because of the value when 2R is measured by the method in the left figure if the tubing is bent or flattened, etc.

How to Order

Metric size TH0604∥N

Indication of tubing model •

	Color indication
Symbol	Color
N	Translucent (Material color)
R	Red (Translucent)
BU	Blue (Translucent)
В	Black (Opaque)

Length per roll Symbol Roll size 20 m roll

100 m roll Note) 100 m roll is available with translucent (color indication: N) only.



Made to Order

(Please contact SMC for specifications in detail, dimensions, delivery and specifications other than those mentioned above.)

Reinforced corrugated cardboard specification longer length reel

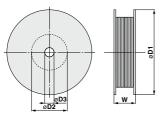
ø6, Translucent only: Suffix "-X64" to the end of part number. Ex.) TH0604N-500-X64

Made to Order Availability

Part no.	Length Model	TH0604N	Color
X64	250 m reel	0	Translucent
A04	500 m reel	0	Translucelli

Reinforced corrugated cardboard specification: Longer length reel/-X64

Dimensions



Dimensions					
Model	ø D1	ø D2	ø D3	w	Weight (kg)
TH0604N-250-X64	475	200	52	120	9.4
TH0604N-500-X64	475	200	52	220	18.5

KQ2

KQB2

KS KX KM

KF

M

H/DL L/LL KC

KK

KK130

DM

KDM KB

KR

KA

KQG2 KG

KFG2

MS

KKA KΡ

LQ

MQR

FEP Tubing (Fluoropolymer) Inch Size TIH Series





Operating Temperature: Max. 200°C

It varies depending on the operating pressure. Refer to the graph for the maximum operating pressure.

Compatible with the Food Sanitation Law

- . Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.
- . Complies with FDA (Food and Drug Administration) §177.1550 dissolution test.

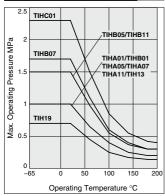
Flame Resistant (Equivalent to UL-94 Standard V-0)

How to measure the minimum bending radius.



At a temperature of 20°C, bend the tubing into a U shape. Fix one end and gradually move the other end closer. Measure 2R at the point where the outside diameter's rate of change is 5%.

Max. Operating Pressure



Note) The maximum operating pressure varies dependant on the I.D. bore size even if the O.D. is the same

© 508

Series

■-16 m (50 ft) roll
□-33 m (100 ft) roll

0000							•	1 (00 11	,		111 (100	,
			Inch size									
Model		TIHA01	TIHB01	TIHC01	TIHA05	TIHB05	TIHA07	TIHB07	TIHA11	TIHB11	TIH13	TIH19
Tubing O.D.	inch		1/8"		3/	16"	1/	4"	3/	8"	1/2"	3/4"
rubing O.D.	mm		3.18		4.	75	6.3	35	9.	53	12.7	19.05
Tubing I.D.	inch	0.093"	0.086"	0.065"	0.137"	0.124" (1/8")	0.18"	0.156" (5/32")	0.275"	0.25" (1/4")	0.374" (3/8")	0.624" (5/8")
	mm	2.36	2.18	1.65	3.48	3.15	4.57	3.95	6.99	6.33	9.5	15.85
Color	Symbol	1										
Translucent	N											
Red (Translucent)	R	ertlacktright	-	-	-	-	-	-	-	-	-	-
Blue (Translucent)	BU	┝┿╌	-∳-	-∳-	-∳-	-∳-	-∳-	-∳-	-∳-	-∳-	-∳-	-∳-
Black (Opaque)	В	┝┷╌	_	_		-		_	_	_	_	_

<u> </u>													
Fluid		Air, Water Note 1), Inert gas											
Applicable fi	ittin	gs Note 2)	One-t	ouch fit	tings, li	nsert fit	tings ^{Not}	^{е 3)} , Flu	oropoly	mer fitt	ings: L	Q serie	S Note 4)
		20°C or less		1		1	1.5	1	1.7	1	1.5	1	0.7
Max. operati		100°C		.4	0.85	0.4	0.55	0.4	0.6	0.4	0.55	0.4	0.25
pressure (MI	Pa)	200°C	0	.2	0.4	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.1
				Refer to the max. operating pressure curve.									
Min. bending radius	Reco radiu	mmended s	25	20	10	35	25	55	35	85	60	95	220
(mm) Note 5)	Tube radius	close bend	20	12	7	25	20	35	20	55	30	60	160
Operating temperal	ture (fi	xed usage)	Air, Inert gas: -65 to 200°C Water: 0 to 100°C (No freezing					ing)					
Material	ial FEP (Fluorinated Ethylene Propylene Resin)												

Note 1) When using a fluid in liquid form, the surge pressure must not exceed the maximum operating pressure. A surge pressure higher than the maximum operating pressure can cause breakage of the fittings, or rupture of the tubing. Furthermore, an abnormal temperature increase due to adiabatic compression can also result in ruptured tubing. Note 2) Do not use in locations where the FEP tubing will move.

Be sure to operate under the maximum operating pressure conditions using the lower maximum operating specification of either the tubing or fittings.

After long term use or under high temperatures, some fittings leakage may occur due to material deterioration with age. Perform periodic inspections, and if any leakage is detected, replace with a new product immediately. When the insert and miniature fittings are used over extended periods of time, it may cause leakage due to the material deterioration of age. In such a case, give an additional tightening to the tube connection part. If leakage still occurs after giving an additional tightening, replace the fitting with a new product. For other precautions, refer to "Fittings & Tubing Precautions". When using the fluoropolymer fittings, refer to the precautions on pages 445 and 446. Select the size after confirming O.D. and I.D.

Note 3) As leakage may occur with the KFG2 series if the fluid is repeatedly heated and cooled or if there is a sudden change in the ambient temperature, we recommend considering the TID series

Note 4) TIHA01, TIHC01, TIHA05, TIHA07 and TIHA11 are not available because of different internal diameters.

Note 5) The minimum bending radius is the representative value measured as shown in the left figure.

- . Use a tube above the recommended minimum bending radius.
- . The tubing may be bent if used under the recommended minimum bending radius. Therefore, refer to the tube close bend radius and make sure that the tubing is not bent or flattened.
- . Please note that the tube close bend radius is not warranted because of the value when 2R is measured by the method in the left figure if the tubing is bent or flattened, etc.

How to Order



Indication of tubing model •

	Color indication -
Symbol	Color
N	Translucent (Material color)
R	Red (Translucent)
BU	Blue (Translucent)
В	Black (Opaque)

Length per roll

Symbol	Roll size
16	16 m (50 ft) roll
33 Note)	33 m (100 ft) roll

Note) 33 m(100 ft) roll is available with translucent (color indication: N) only.



Soft Fluoropolymer Tubing **Metric Size**

TD Series





Flexibility: Improved by approx. 20%

SMC comparison (Fluoropolymer tubing, TL/TIL series)

Compatible with the Food Sanitation Law

- · Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959
- · Complies with FDA (Food and Drug Administration) §177.1550 dissolution test

Operating Temperature: Max. 260°C

It varies depending on the operating pressure. Refer to the graph for the maximum operating pressure.

Flame Resistant (Equivalent to UL-94 Standard V-0)

How to measure the minimum bending radius



Bend the tubing into the U-form at a temperature of 20°C. Fix one end and close loop gradually. Measure 2R when the deformed ratio of the tubing diameter at bending reaches 5%.

Model/Specifications

Size		Metric size				
Model		TD0425	TD0604	TD0806	TD1075	TD1209
Tubing O.D.	(mm)	4	6	8	10	12
Tubing I.D. (I	mm)	2.5	4	6	7.5	9
Roll	10 m	•	•	•	•	•
noii	20 m	•	•	•	•	•
Color		Translucent (material color)				
Applicable fl	uid	Refer to the applicable fluid in page 511.				
Fluid Note 1)		Air, Water Note 1), Inert gas				
Applicable fit	tings Note 2)	Insert fittings KF series Stainless Steel 316 insert fittings KFG2 series Miniature fittings M, MS series (Hose nipple type) Fluoropolymer fitting LQ series				
	20°C or less	1.6	1.4	0.9	0.9	0.9
Max. operating	100°C	0.9	0.7	0.5	0.5	0.5
pressure (MPa)	200°C	0.45	0.35	0.25	0.25	0.25
	260°C	0.23	0.2	0.15	0.15	0.15
Min. bending radius (mm) Note 3)	Recommended radius	15	25	45	55	75
	Tube close bend radius	8	16	31	35	41
Operating temperature (fixed usage)		Air, Inert gas: -65 to 260°C Water: 0 to 100°C (No freezing)				
Material		Modified PTFE (Polytetrafluoroethylene resin)				

Note 1) When using a liquid fluid, the surge pressure must be under the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubing. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tubing bursting.

Note 2) Do not use this product in a manner in which the tubing is not fixed.

Observe the lesser value of the maximum operating pressure between the tubing and fittings. A material change over a long duration or due to high-temperature may cause leakage. Perform periodic maintenance and replace with a new product immediately when abnormalities are detected.

(Refer to "Maintenance" of the tubing precautions on page 514.)

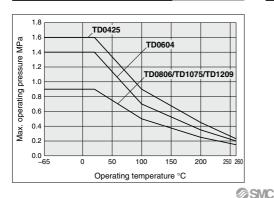
For other precautions, refer to "Fittings & Tubing Precautions" on pages 13 to 17. When using the fluoropolymer fittings, refer to the precautions on pages 445 and 446.

Note 3) The minimum bending radius is the representative value measured as shown in the left figure.

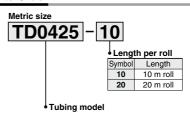
• Use a tube above the recommended minimum bending radius.

- . The tubing may be bent if used under the recommended minimum bending radius.
- Therefore, refer to the tube close bend radius and make sure that the tubing is not bent or flattened. • Please note that the tube close bend radius is not warranted because of the value when 2R is measured by the method in the left figure if the tubing is bent or flattened, etc.

Maximum Operating Pressure



How to Order



KQ2

KQB2

KM

KF M

> H/DL L/LL

KC KK

KK130 DM

KDM

KB

KR

KA KQG2

KG

KFG2

MS

KKA

KP L₀

MOR

Soft Fluoropolymer Tubing Inch Size TID Series





Flexibility: Improved by approx. 20%

* SMC comparison (Fluoropolymer tubing, TL/TIL series)

Compatible with the Food Sanitation Law

- Compatible with the test conforming to the Food Sanitation Law based on the 370th notice given by the Ministry of Health and Welfare in 1959.
- Complies with FDA (Food and Drug Administration) §177.1550 dissolution test.

Operating Temperature: Max. 260°C

It varies depending on the operating pressure. Refer to the graph for the maximum operating pressure.

Flame Resistant (Equivalent to UL-94 Standard V-0)

How to measure the minimum bending radius



Bend the tubing into the U-form at a temperature of 20°C. Fix one end and close loop gradually. Measure 2R when the deformed ratio of the tubing diameter at bending reaches 5%.

Model/Specifications

woden Specifications						
Size		Inch size				
Model		TID01	TID05	TID07	TID11	TID13
Tuble of O.D.	inch	1/8"	3/16"	1/4"	3/8"	1/2"
Tubing O.D.	mm	3.18	4.75	6.35	9.53	12.7
Tubing I.D.	inch	0.086"	0.124" (1/8")	0.156" (5/32")	0.25" (1/4")	0.374" (3/8")
	mm	2.18	3.15	3.95	6.33	9.5
Roll	8 m (25 ft)	•	•	•	•	•
noii	16 m (50 ft)	•	•	•	•	•
Color		Translucent (material color)				
Applicable fl	uid	Refer to the applicable fluid in page 511.				
Fluid Note 1)		Air, Water Note 1), Inert gas				
Applicable fittings Note 2)		Stainless Steel 316 insert fittings KFG2 series Fluoropolymer fitting LQ series				
	20°C or less	1.4	1.4	1.6	1.4	0.9
Max. operating	100°C	0.7	0.7	0.9	0.7	0.5
pressure (MPa)	200°C	0.35	0.35	0.45	0.35	0.25
	260°C	0.2	0.2	0.23	0.2	0.15
Min. bending radius (mm) Note 3)	Recommended radius	15	20	25	40	75
	Tube close bend radius	9	10	15	23	42
Operating temperature (fixed usage)		Air, Inert gas: -65 to 260°C Water: 0 to 100°C (No freezing)				
Material	Material		Modified PTFE (Polytetrafluoroethylene resin)			
		•				

Note 1) When using a liquid fluid, the surge pressure must be under the maximum operating pressure. If the surge pressure exceeds the maximum operating pressure, it will result in damage to fittings and tubing. Furthermore, abnormal temperature rise caused by adiabatic compression may result in the tubing bursting.

Note 2) Do not use this product in a matter in which the tubing is not fixed.

Observe the lesser value of the maximum operating pressure between the tubing and fittings. A material change over a long duration or due to high-temperature may cause leakage. Perform periodic maintenance and replace with a new product immediately when abnormalities are detected.

(Refer to "Maintenance" of the tubing precautions on page 514.)

For other precautions, refer to "Fittings & Tubing Precautions" on pages 13 to 17. When using the fluoropolymer fittings, refer to the precautions on pages 445 and 446.

Note 3) The minimum bending radius is the representative value measured as shown in the left figure.

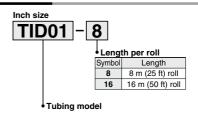
• Use a tube above the recommended minimum bending radius.

- Use a tube above the recommended minimum bending radius.
 The tubing may be bent if used under the recommended minimum bending radius.
- Therefore, refer to the tube close bend radius and make sure that the tubing is not bent or flattened.
- Please note that the tube close bend radius is not warranted because of the value when 2R is measured by the method in the left figure if the tubing is bent or flattened, etc.

Maximum Operating Pressure

1.8 TID07 1.6 pressure MPa TID01/TID05/TID11 12 TID13 1.0 operating 0.8 0.6 0.2 0.0 100 200 250 260 Operating temperature °C

How to Order



[®] 510

Related Products

Tube Cutter: TK-5

As this product is made of stainless steel it can be used inside clean rooms.

* However, this product is packaged regularly, not in double packaging.

Safety lock contained



Note) The blade can be easily replaced with a Phillips head screwdriver.

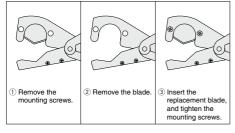
Please refrain from touching the blade tip during replacement. Failure to
do so may result in injury.

Be aware that when loosening the mounting screws, the blade may fall

Be aware that when loosening the mounting screws, the blade may fall out, causing injury.

Model	TK-5
Applicable tubing material	Fluoropolymer, Polyolefin, and other soft plastic tubing
Applicable tubing O.D.	25 mm or less
Weight	100 g
Replacement blade part no.	TK-DPM00132 (5 replacement blades)

How to Replace the TK-5 Blade



KQ2

KQB2

KM

KF

M H/DL L/LL

KC

KK

KK130

DM KDM

КВ

KR

KA

KQG2

KG KFG2

MS

KKA

KP LO

MQR



TL/TIL/TD/TID Series Applicable Fluid List

Chemical resistance of Fluoropolymer Super PFA, modified PTFE material

Chemicals in the list below are chemically inert Note 1) to Super PFA, modified PTFE material. Possible physical effects may occur such as penetration and swelling due to temperature, pressure and chemical concentration. To use Super PFA, modified PTFE tube in a chemical environment, tests should be performed with the same environment to ensure no problem occurs with operating environment.

1,1,1-Trichloroethane	Formic acid	Trichloroethylene
1,1,2-Trichloroethane	Ethyl formate	Trichloroacetic acid
1,2,3-Trichloropropane	Propyl formate	Toluene
1,2-Dichlorobutane	Methyl formate	Naphtha
2,4-Dichlorotoluene	Xylene	Carbon dioxide
2-chloropropane	Glycol	Nitrogen dioxide
2-nitro-2-methylpropane	Glycerine	Nitrobenzene
2-nitrobutanol	Cresol	Nitromethane
Pentabasic benzamide	Chromic acid	Carbon disulfide
Hydrochlorofluorocarbon-22	Chloracetic acid	Piperidine
N-octadecanol	Chlorosulfonic acid	Pyridine
N-butylamine	Chloroform	Pyrogallol
o-chlorotoluene	Paraffinum liquidum	Phenol
Isobutyl adipate	Acetate	Butanol
Acetyl chloride	Amyl acetate	Phthalic acid
Acetophenone	Ethyl acetate	Hydrofluoric acid
Acetone	Potassium	Furan
Aniline	Butyl acetate	Ethyl propionate
Sulfurous acid gas	Propyl acetate	Propyl propionate
Allyl chloride	Methyl acetate	Methylpropionate
Benzoic acid	Salicylic acid	Propylene chloride
Ammonium	Sodium hypochlorite	Bromobenzene
Sulfur	Diisobutyl ketone	Hexachlorethane
Isoamyl alcohol	Diethylamine	Hexane
Isooctane	Carbon tetrachloride	Heptane
Ethanol	Dioxane	Benzyl alcohol
Ethyl ether	Cyclohexanone	Benzaldehyde
•	Cyclohexane	Benzine
Ethylene glycol Ethylene chloride	Dichloroethylene	Benzoyl chloride
Ethylenediamine	Dichloropropylene	Benzonitrile
Zinc chloride	,	Pentachloroethane
Aluminum chloride	Dibutyl phthalate	Boric acid
	Dimethyl ether	
Ammonium chloride	Dimethylsulfoxide	Sodium boric acid
Calcium chloride	Dimethylformamide	Formaldehyde
Ferrous chloride	Hydrobromic acid	Acetic anhydride
Mercuric chloride	Potassium dichromate	Methanol
Stannous chloride	Bromine	Methyl ether
Ferric chloride	DI water (Pure water)	Methyl ethyl ketone
Cupric chloride	Nitric acid	Methylene chloride
Sodium chloride	Ammonium hydroxide	Ethyl butyrate
Magnesium chloride	Potassium hydroxide	Methyl butyrate
Hydrochloric acid	Sodium hydroxide	Hydrogen sulfide
Chlorine	Soap, detergent	Sulphuric acid
Aqua regia	Diethyl carbonate	Zinc sulfate
Ozone	Sodium carbonate	Ammonium sulfate
Oleic acid	Tetrachloroethane	Ferrous sulfate
Perchlorate	Tetrachloroethylene	Copper sulfate
Hydrogen peroxide	Tetrahydrofuran	Phosphoric acid
Natrium peroxide	Tetrabromoethane	Sodium phosphate
Gasoline	Triethanolamine	· ·
Potassium permanganate	Triethylamine	
Note of the control o	1,	

Note 1) "Chemically inert" means – not to cause any chemical reaction.

Note 4) SMC is not responsible for its accuracy and any damage happened because of this data.



IDK

KQ2 KQB2

KM KF

H/DL L/LL KC

KK130
DM
KDM
KB
KR
KA
KQG2
KG
KFG2
MS
KKA
KP
LQ
MQR

Note 2) The data above is based on the information presented by the material manufacturers.

Note 3) The applicable fluid list provides reference values as a guide only, therefore we do not guarantee the application to our product.



Chemical resistance of Fluoropolymer PFA material

Chemicals in the list below are chemically inert Note 1), to PFA material. Possible physical effects may occur such as penetration and swelling due to temperature, pressure and chemical concentration.

To use PFA tube in a chemical environment, tests should be performed with the same environment to ensure no problem occurs with operating environment.

Aluminum fluoride	Acetate	Butyl stearate	Ethylene dicloride	Malic acid	Salicylic acid
Acetylene Calcium Institute Ethylene oxide Mercury Silicone grease	Acetic anhydride	- '	+ · · · · · · · · · · · · · · · · · · ·	Mercaptan	
Acylonitrile Calcium hypdroxide Fatty acid Methyl acetate Silver nitrate Aluminum acetate Calcium hypdroxide Ferric rolloride Methyl alcohol Sodium bicultate Aluminum nitrate Calcium nitrate Ferric nitrate Methyl chloride Sodium bicultate Aluminum nitrate Calcium sulfide Ferric sulfate Methyl chloride Sodium bicultate Sodium bicultate Aluminum chloride Carbon dioxide Fluorobenzene Methyl ethyl ketone Sodium bicultate Sodium bicultate Sodium prochorite (5% Methyl sobutyl ketone Sodium phypochlorite (5% Methyl sobutyl	Acetone	Calcium bisulfite	Ethylene oxide	Mercuric chloride	Silicone grease
Aluminum acetate Calcium hypochlorite Ferric chloride Methyl chloride Sodium bisultate Aluminum nitrate Calcium initrate Ferric nitrate Methyl chloride Sodium bisultate Methyl ethyl ketone Sodium bisultite Ferric sultate Methyl ethyl ketone Sodium bisultite Aluminum bromide Carbon disultide Ferric sultate Methyl ethyl ketone Sodium bisultite Aluminum floride Carbon disultide Fluorbonc acid Methyl isobutyl ketone Sodium phosphate Aluminum fluoride Carbon disultide Fluorboncane Methyl methacrylate Sodium phosphate Aluminum sulfate Carbon disultide Fluorboncane Methyl methacrylate Sodium phosphate Ammonia gas Castor oil Formaldehyde Mineral oil Sodium phosphate Ammonium carbonate Caustic soda (30%) Formic acid Monochloroacetic acid Sodium phosphate Ammonium carbonate Caustic soda (30%) Formic acid Monochloroacetic acid Sodium phosphate Ammonium phrodoxide Cellosolve Furfural Monochloroacetic acid Sodium phosphate Ammonium nitrate Chlorosulfonic acid Gascline Monoethanolamine Sodium sulfitle Ammonium nitrate Chlorosulcene Gelatine Naphtha Soybean oil Ammonium pirsulfate Chromic acid Gliucose Naphthenic acid Steanic acid Ammonium persulfate Citric acid Gliucose Naphthenic acid Steanic acid Ammonium pirsulfate Coconut oil Gliue Natrium peroxide Syrene Mamonium pirsulfate Copper cyanide Glycerine Natural gas Sucrose solution Amyl acetate Copper sulfate Grease Nickel acetate Sulfur chloride Amyl acetate Copper sulfate Grease Nickel acetate Sulfur chloride Amyl acetate Copper sulfate Grease Nickel acetate Sulfur chloride Amyl acetate Copper sulfate Grease Nickel acetate Sulfur chloride Amyl acetate Copper sulfate Grease Nickel acetate Sulfur chloride Amyl acetate Copper sulfate Grease Nickel acetate Sulfur chloride Amyl acetate Copper sulfate Grease Nickel acetate Sulfur chloride Amyl acetate Copper sulfate Grease Nickel acetate Sulfur chloride Amyl acetate Copper sulfate Grease Nickel acetate Sulfur chloride Amyl acetate Copper sulfate Sulf	Acetylene	Calcium chloride	Ethylenediamine	Mercury	Silicone oil
Aluminum nitrate	Acrylonitrile	Calcium hydroxide	Fatty acid	Methyl acetate	Silver nitrate
Aluminum bromide Aluminum chloride Aluminum sulfate Aluminum sulfate Aluminum sulfate Aluminum sulfate Aluminum sulfate Aluminum sulfate Ammonia gas Castor oii Formidehyde Ammonia gas Castor oii Formidehyde Ammonia carbonate Caustic soda (30%) Fermic acid Ammonium chloride Cellosolve Furfural Ammonium pridoxide Copper sulfate Citric acid Glucose Natrum peroxide Styrene Natrum peroxide Styrene Natrum peroxide Styrene Natrum pridoxide Natrum prido	Aluminum acetate	Calcium hypochlorite	Ferric chloride	Methyl alcohol	Sodium bicarbonate
Aluminum hloride Carbon dioxide Fluorboric acid Methyl isobutyl ketone Sodium hypochlorite (5% Aluminum fluoride Carbon disulfide Fluorobenzene Methyl methacrylate Sodium metaphosphate Aluminum sulfate Carbonic acid Fluosilicia acid Methylene dichloride Sodium metaphosphate Aluminum sulfate Carbonic acid Fluosilicia acid Methylene dichloride Sodium perborate Ammonium carbonate Caustic soda (30%) Forma acid Monochloroacetic acid Sodium perborate Ammonium carbonate Caustic soda (30%) Forma acid Monochloroacetic acid Sodium phosphate Ammonium ritrolide Cellosolve Furfural Monochlorobenzene Sodium sulfitie Ammonium hydroxide Chlorosulfonic acid Gasoline Monochloroacetic acid Sodium phosphate Ammonium nitrate Chlorotoluene Gelatine Naphtha Sodium thiosulfate Ammonium nitrate Chromic acid Glauber's salt Naphthalene Stannic chloride Ammonium phosphate Coconut oil Glue Natrium peroxide Stearic acid Ammonium phosphate Coconut oil Glue Natrium peroxide Styrene Ammonium sulfate Copper syanide Grease Nickel acetate Sulfur Copper syanide Grease Nickel acetate Sulfur Copper syanide Grease Nickel acetate Sulfur Carbonate Garage Nickel acetate Sulfur Carbonate Grease Nickel austia Sulfur Carbonate Garage Hexander Grease Nickel sulfate Sulfur cacid (98%) Amyl naphthalene Creosote oil Hexaldehyde Nickel chloride Sulfur cacid (98%) Sulfurious acid gas Aniline Qve Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Animal oil (Lard oil) Cyclohexane Hydrochloric acid (99%) Nitropopane Tetrachloroethane Taranic acid Arsenic acid Cyclohexanone (Anon) Hydrochloric acid anhydrous Oxyalic acid Tetrahydrofuran Earlum hydroxide Dichlyrise phasaete Hydrogen sulfide Oxyagen Tetrahloroethane Perchloroethane Dichlorobenzene Hydrogen sulfide Oxyagen Tetrahloroethylene Gerzie Diphenyl keton Isophyl elad Phydrogen oli Phydrolioric acid anhydrous Aghalt Dibutyl phhalate Hydrogen sulfide Perchlorote Hydrochloric Edia anhydrous Cyclohexanon Diphenyl Head Dichlyrise Bacate Hydrogen oli Phenol Trichorophylene Tributyl phosphate Berziene Diphen	Aluminum nitrate	Calcium nitrate	Ferric nitrate	Methyl chloride	Sodium bisulfate
Aluminum fluoride Carboni daudifide Fluorobenzene Methyl methacrylate Sodium metaphosphate Aluminum sulfate Carbonic acid Fluosilicia acid Methylene dichloride Sodium mitrate Carbonic acid Formatichylde Mineral oil Sodium perborate Ammonium carbonate Caustic soda (30%) Formic acid Monochlorobenzene Sodium phosphate Ammonium carbonate Caustic soda (30%) Formic acid Monochlorobenzene Sodium phosphate Ammonium ritrate Chlorosulfonic acid Gasoline Monoethanolamine Sodium sulfifee Ammonium nitrate Chlorosulfonic acid Gasoline Monoethanolamine Sodium thiosulfate Ammonium nitrate Chlorosulfonic acid Glauber's salt Naphthalene Sophsan oil Ammonium nitrate Chromic acid Glauber's salt Naphthalene Sophsan oil Ammonium persulfate Citric acid Glauber's salt Naphthalene Stannic chloride Ammonium persulfate Cocomut oil Gluce Natrium persulfate Cocomut oil Gluce Natrium persulfate Copper cyanide Glycerine Natural gas Sucrose solution Amyl acetate Copper sulfate Grease Nickel acetate Sulfur Amyl alcohol Corn oil Hexaldehyde Nickel chloride Sulfur chloride Amyl alcohol Corn oil Hexaldehyde Nickel chloride Sulfur chloride Amyl alcohol Corn oil Hexaldehyde Nickel chloride Sulfur cloride Amyl naphthalene Creosote oil Hexaldehyde Nickel sulfate Sulfuric acid (98%) Aniline Cresol Hydrochloric acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid (49%) Nitrobenzene Tannic acid Aniline dye Cyclohexanne Hydrocyanic acid Nitrobenzene Tarnic acid Aniline dye Cyclohexanne Hydrocyanic acid Aniline Organic Aliane Hydrocyanic acid Aniline Organic Anil	Aluminum bromide	Calcium sulfide	Ferric sulfate	Methyl ethyl ketone	Sodium bisulfite
Aluminum sulfate Carbonic acid Fluosilicic acid Methylene dichloride Sodium nitrate Ammonia gas Castor oil Formaldehyde Mineral oil Sodium perborate Ammonium carbonate Caustic soda (30%) Formic acid Monochlorosetic acid Sodium phosphate Caustic soda (30%) Formic acid Monochlorobenzene Sodium sulfite Ammonium chloride Cellosolve Furfural Monochlorobenzene Sodium sulfite Mamonium hydroxide Chlorosulfonic acid Gasoline Monochlorobenzene Sodium sulfite Ammonium nitrate Chlorotoluene Gelatine Naphtha Soybean oil Ammonium nitrate Chlorotoluene Gelatine Naphtha Soybean oil Ammonium nitrate Chlorotoluene Gelatine Naphthalene Stannic chloride Ammonium presultate Chromic acid Glucose Naphthenic acid Stannic chloride Ammonium presultate Coconut oil Gluce Natrium peroxide Styrene Ammonium sulfate Copper cyanide Giycerine Natural gas Sucrose solution Amyl acetate Copper sulfate Grease Nickel acetate Sulfur Amyl alcohol Corn oil Hexaldehyde Nickel acetate Sulfur chloride Amyl alcohol Corn oil Hexaldehyde Nickel sulfate Sulfuria caid (98%) Amyl naphthalene Creosote oil Hexane Nickel sulfate Sulfuria caid (98%) Aniline Creosote oil Hexaldehyde Nickel sulfate Sulfuria caid (98%) Aniline Creosote oil Hydrorbornic acid Nitroehane Tannic acid Aniline dye Cupric chloride Hydrorbornic acid Nitroehane Tannic acid Aniline dye Cupric chloride Hydrorbornic acid Nitroehane Tannic acid Animal oil (Lard oil) Cyclohexane Hydrogenic acid Nitroehane Tannic acid Ansenic acid Cyclohexane Hydrogenic acid Nitroehane Terpineol Tetrachloroethane Aphalat Dibutyl phthalate Hydrogen peroxide (30%) Nalia caid Tetrachyrofenane Barium hydroxide Diethyl sebacate Hydrogen peroxide (30%) Oxalia caid Tetrachlyrolane Barium sulfate Dibutyl phthalate Isooctane Perchiorate Tributoxy ethyl phosphate Beerus phosphate Dibotyl phthalate Isooctane Perchiorate Tributoxy ethyl phosphate Beerusine Diphenyl wide Kerosene Picric acid Tributyl phosphate Ferniorate Diphenyl sode Kerosene Picric acid Tributyl phosphate Benzala lacohol Epichlorode Elihanolamine Lead autatae	Aluminum chloride	Carbon dioxide	Fluorboric acid	Methyl isobutyl ketone	Sodium hypochlorite (5%)
Ammonia gas Castor oil Formaldehyde Mineral oil Sodium perborate Ammonium carbonate Caustic soda (30%) Formic acid Monochloroacetic acid Sodium phosphate Ammonium chloride Cellosolve Furtural Monochloroacetic acid Sodium phosphate Ammonium hydroxide Chlorosulfonic acid Gasoline Monoethanolamine Sodium utilite Ammonium hydroxide Chlorosulfonic acid Gasoline Naphtha Soybean oil Ammonium nitrite Chromia acid Glauber's salt Naphthalene Stanic chloride Ammonium nitrite Chromia acid Glauber's salt Naphthalene Stanic chloride Ammonium persulfate Chromia acid Glaucose Naphthalene Stanic chloride Ammonium persulfate Coconut oil Glue Natrium peroxide Styrene Ammonium phosphate Coconut oil Glue Natrium peroxide Styrene Coconut oil Hexaldehyde Nickel acetate Sulfur Coconut Oil Hexaldehyde Nickel chloride Sulfur chloride Amyl acetate Copper sulfate Grease Nickel acetate Sulfur Gobol Corno II Hexaldehyde Nickel chloride Sulfur chloride Amyl acetate Coconut Hexaldehyde Nickel chloride Sulfur chloride Amyl aphthalene Creosote oil Hexane Nickel sulfate Sulfuric acid (89%) Amyl naphthalene Creosote oil Hexaldehyde Nickel sulfate Sulfuric acid (89%) Amyl naphthalene Creosote oil Hydrorboric acid Nitroehzane Tanic acid Aniline Cresol Hydrorboric acid Nitroehzane Tanic acid Aniline Ocyclohexane Hydrorboric acid Nitroehzane Tanic acid Animal oil (Lard oil) Cyclohexane Hydrorboric acid Aniline Cresol Nitroehzane Tanic acid Animal oil (Lard oil) Cyclohexane Hydrorboric acid anhydrous Octyl alcohol Tetraethyl lead Cyclohexanone (Anon) Hydrofluoric acid anhydrous Octyl alcohol Tetraethyl lead Cyclohexane Hydrogen peroxide (30%) Nitroehzane Tetraelhoroethane Tetraelhoroethane Dichyl phosphate Dichyl phosphate Isoorcane Hydrogen poxide (30%) Nitroehzane Tetraelhoroethylene Tibulory ethyl pho	Aluminum fluoride	Carbon disulfide	Fluorobenzene	Methyl methacrylate	Sodium metaphosphate
Ammonium carbonate Caustic soda (30%) Formic acid Monochloroacetic acid Sodium phosphate Ammonium holoride Cellosolive Furtural Monochlorobenzene Sodium sulfite Ammonium hydroxide Chlorosulfonic acid Gasoline Monochlorobenzene Sodium sulfite Ammonium hydroxide Ammonium hydroxide Chlorosulfonic acid Gasoline Monochlorobenzene Sodium sulfite Ammonium nitrate Chlorobluene Gelatine Naphtha Soybean oil Ammonium persulfate Chlorosacid Gilucese Naphthalene Stannic chloride Ammonium persulfate Citric acid Glucese Naphthalene Stannic chloride Ammonium phosphate Coconut oil Glue Natrium peroxide Strearic acid Strearic acid Ammonium phosphate Copper cyanide Glycerine Natural gas Sucrose solution Ammonium sulfate Copper sulfate Grease Nickel acetate Sulfur Amyl acetate Copper sulfate Grease Nickel acetate Sulfur Amyl acetate Com oil Hexaldehyde Nickel chloride Sulfur chloride Amyl borate Cottonseed oil Hexane Nickel sulfate Sulfuric acid (89%) Amyl naphthalene Cresol Hexane Nickel sulfate Sulfuric acid (89%) Amyl naphthalene Cresol Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Cresol Hydrobromic acid Nitroenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitroenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitroenzene Tannic acid Animal oil (Lard oil) Cyclohexane Hydrogenic acid (49%) Nitroenzene Terachlorochlane Tartaric acid Cyclohexano Hydrofluoric acid anhydrous Octyl alcohol Tetraethyl lead Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrahydrofuran Dibotyl phthalate Hydrogen peroxide (30%) Oxalic acid Triaction Barium sulfate Diethylene glycol Hydrogensulfide Oxygen Tetralin Barium sulfate Diethylene glycol Hydrogensulfide Oxygen Tetralin Perchlorote Diethylene glycol Hydrogensulfide Oxygen Tetralin Barium sulfate Diethylene glycol Hydrogensulfide Oxygen Tetralin Barium sulfate Diethylene glycol Hydrogensulfide Oxygen Tetralin Perchlorote Diethylene glycol Hydrogensulfide Oxygen Tetralin Barium sulfate Diethylene glycol Hydrogene Perchlorosethylene Tribut	Aluminum sulfate	Carbonic acid	Fluosilicic acid	Methylene dichloride	Sodium nitrate
Ammonium chloride Ammonium hydroxide Cellosolve Chlorosulfonic acid Casoline Monoethanolamine Sodium thiosulfate Ammonium hydroxide Chlorosulfonic acid Gasoline Monoethanolamine Sodium thiosulfate Ammonium nitrate Chromic acid Clitic acid Clitic acid Clocose Ammonium persulfate Ammonium persulfate Coconut oil Gilue Nathima peroxide Stranic chloride Ammonium phosphate Coconut oil Gilue Nathima peroxide Styrene Ammonium sulfate Copper cyanide Copper sulfate Grease Nickel acetate Nickel chloride Sulfur Nickel chloride Sulfur chloride Amyl alcohol Corn oil Hexaldehyde Nickel sulfate Sulfurica acid (98%) Amyl naphthalene Cresote oil Hexyl alcohol Nitric acid (60%) Sulfurous acid gas Aniline Cresot eil Heydrofronic acid Nitrobenzene Tannic acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrofrolioric acid Nitropenzene Tararic acid Argua regia Cyclohexane Hydrocyanic acid Nitropentane Terpineol Argua regia Cyclohexane Hydrocyanic acid Nitropenzene Tertrachlorethane Tertrachl	Ammonia gas	Castor oil	Formaldehyde	Mineral oil	Sodium perborate
Ammonium hydroxide Chlorosulfonic acid Gasoline Monoethanolamine Sodium thiosulfate Ammonium nitrate Chlorotoluene Gelatine Naphtha Soybean oil Chlorotoluene Gelatine Naphthalene Stanic chloride Ammonium nitrate Chromic acid Glauber's salt Naphthalene Stanic chloride Ammonium persulfate Citric acid Glucose Naphthenic acid Stearic acid Stearic acid Ammonium phosphate Coconut oil Glue Natrium peroxide Styrene Natural gas Sucrose solution Ammonium sulfate Copper cyanide Glycerine Natural gas Sucrose solution Ammonium sulfate Copper sulfate Grease Nickel acetate Sulfur Amyl acetate Copper sulfate Grease Nickel acetate Sulfur Amyl alcohol Com oil Hexaldehyde Nickel holride Sulfur chloride Amyl borate Cottonseed oil Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Creosote oil Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Creosote oil Hexal alcohol Nitro acid (60%) Sulfurous acid gas Aniline Cycolohexane Hydrochloria acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloria caid Nitrobenzene Tanaric acid Anilinal oil (Lard oil) Cyclohexane Hydrocyanic acid Nitrobenzene Terprineol Aqua regia Cyclohexanone (Anon) Hydrofluoric acid anhydrous Cyclohexano Tertrachloroethane Terprineol Aspahalt Dibutyl phthalate Hydrogen peroxide (30%) Nitropenane Tertrachloroethane Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium sulfide Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium sulfide Disopropyl keton Isobutyl alcohol Perchorate Tributoxy ethyl phosphate Bear Sulfurium sulfide Disopropyl keton Isobutyl alcohol Perchorate Tributoxy ethyl phosphate Berzaldehyde Dipenene (Limonene) Isopropyl acetate Perchlorated Tributoxy ethyl phosphate Benzaldehyde Dipenene (Limonene) Isopropyl acetate Perchloracid Trioty Vegetable oil Penol Trictorosthylene Tributoxy ethyl phosphate Benzale Hydrosolue Epichlorohydrin Lead acetate Piperidine Turpentine oil Eenzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl alcohol Epichlorohydrin Lead acetate Potassium hydr	Ammonium carbonate	Caustic soda (30%)	Formic acid	Monochloroacetic acid	Sodium phosphate
Ammonium nitrate Chlorotoluene Gelatine Naphtha Soybean oil Ammonium nitrite Chromic acid Gilauber's salt Naphthalene Stannic chloride Ammonium persulfate Citric acid Gilucose Naphthalene Stannic chloride Ammonium persulfate Citric acid Gilucose Naphthalene Stannic chloride Ammonium phosphate Coconut oil Gilue Natrium peroxide Styrene Ammonium sulfate Copper cyanide Gilycerine Natural gas Sucrose solution Amyl acetate Copper sulfate Grease Nickel acetate Sulfur Amyl alcohol Corn oil Hexaldehyde Nickel chloride Sulfur chloride Amyl alcohol Corn oil Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Creosote oil Hexane Nickel sulfate Sulfuric acid (98%) Sulfurous acid gas Aniline Cresol Hydrobromic acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Aniline dye Cyclohexane Hydrocyanic acid Nitrobenzene Tannic acid Arsenic acid Cyclohexane Hydrocyanic acid Nitrobenzene Tetrachioroethane Tetrapineol Arsenic acid Cyclohexanone (Anon) Hydroffluoric acid (149%) Nitropropane Tetrachioroethane Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrahydrofuran Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium sulfide Diethyl sebacate Hydrogen sulfide Oxygen Tetralin Barium sulfide Diethyl sebacate Isopropyl keton Isobutyl alcohol Perchlorate Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Tributyl phosphate Benzine Diphenyl oxide Kerosene Picric acid Tung oil Benzyl benzoate Ethanolamine Lead nitrate Potassium dichromate Vinegar Benzae Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl alcohol Epichlorohydrin Lead acetate Picric acid Tung oil Benzyl benzoate Ethanolamine Lead nitrate Potassium permanganate Potassium permanganate Potassium permanganate Ethyl acetate Ethyl acetate Lead sulfamate Pot	Ammonium chloride	Cellosolve	Furfural	Monochlorobenzene	Sodium sulfite
Ammonium nitrite Chromic acid Glauber's salt Naphthalene Stannic chloride Ammonium persulfate (Citric acid Glucose Naphthenic acid Stearic acid Stearic acid Ammonium phosphate Coconut oil Glue Natrium peroxide Styrene (Coconut oil Glue Natrium peroxide Styrene) Ammonium sulfate Copper cyanide Glycerine Natural gas Sucrose solution (Corporation of Corporation of Corporation of Copper sulfate Grease Nickel acetate Sulfur (Copper sulfate Grease Nickel acetate Sulfur (Copper sulfate Copper sulfate Grease Nickel acetate Sulfur (Corporation of Corporation of C	Ammonium hydroxide	Chlorosulfonic acid	Gasoline	Monoethanolamine	Sodium thiosulfate
Ammonium persulfate Citric acid Glucose Naphthenic acid Stearic acid Ammonium phosphate Coconut oil Glue Natrium peroxide Styrene Styrene Commitme sulfate Copper cyanide Glycerine Natural gas Sucrose solution Amyl acetate Copper sulfate Grease Nickel acetate Sulfur Amyl alcohol Corn oil Hexaldehyde Nickel chloride Sulfur chloride Amyl alcohol Corn oil Hexaldehyde Nickel chloride Sulfur chloride Amyl alcohol Corn oil Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Creosote oil Hexane Nickel sulfate Sulfuric acid (98%) Sulfurous acid gas Aniline Cresol Hydrobromic acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Aniline dye Cyclohexane Hydrocyanic acid Nitrobentane Terpineol Aqua regia Cyclohexane Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Ocyl alcohol Tetraethyl lead Asphalt Dibutyl phhalate Hydrogen peroxide (30%) Oxalic acid Tetrahydrofuran Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphate Beer Dioctyl phthalate Isooctane Perchloroethylene Tributy phosphate Beer Dioctyl phthalate Isooctane Perchloroethylene Tributy phosphate Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzale (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzel (Ethyl acetate Lead nitrate Potassium chloride Vegetable oil Penzyl chloride Ethyl acetate Lead nitrate Potassium hydroxide Water Boric acid Ethyl acetate Lindenic acid Propyl acetate Zinc acetate Disponence Ethyl acetate Lindenic acid Propyl acetate Zinc acetate Ethyl ochoide Ethyl acetate Lindenic acid Propyl acetate Zinc acetate Ethyl ochoide Ethyl acetate Lindenic acid Propy	Ammonium nitrate	Chlorotoluene	Gelatine	Naphtha	Soybean oil
Ammonium persulfate	Ammonium nitrite	Chromic acid	Glauber's salt	Naphthalene	Stannic chloride
Ammonium phosphate Coconut oil Glue Natirum peroxide Styrene Ammonium sulfate Copper cyanide Glycerine Natural gas Sucrose solution Amyl acetate Copper sulfate Grease Nickel acetate Sulfur Amyl aclandol Corn oil Hexaldehyde Nickel chloride Sulfur chloride Amyl alcohol Corn oil Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Cresote oil Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Cresote oil Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Cresote oil Hexane Nickel sulfate Sulfuric acid (98%) Aniline dye Cupric chloride Hydrochloric acid Nitroenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitroenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitroenzene Taranic acid Animal oil (Lard oil) Cyclohexane Hydrocyanic acid Nitroenzene Terprineol Aqua regia Cyclohexanon Hydrofluoric acid (49%) Arisenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Cytl alcohol Tetraethyl lead Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Asphalt Dibutyl phthalate Hydrogen sulfide Oxygen Tetralin Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium sulfate Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphate Beer Dioctyl phthalate Isooctane Perchlorate Tributoxy ethyl phosphate Beer Dioctyl sebacate Isopropyl acetate Petroleum Trichoroethylene Benzaldehyde Dipenere (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzalehyde Dipenere (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzale Benzolol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Water Boric acid Ethyl acetate Lead sulfamate Potassium permanganate Xylene Bunker oil Ethyl bacohol Liquid ammonia Potassium permanganate Sulfice Bunker oil Ethyl benzene Lupe Lupicating oil Propyl alcohol Zinc chloride Butyl acetate Ethyl coxilate Magnesi		Citric acid	Glucose		Stearic acid
Amyl acetate Copper sulfate Grease Nickel acetate Sulfur Amyl alcohol Corn oil Hexaldehyde Nickel chloride Sulfur chloride Amyl alcohol Corn oil Hexane Nickel sulfate Sulfur chloride Amyl borate Cottonseed oil Hexane Nickel sulfate Sulfur cacid (98%) Amyl naphthalene Creosote oil Hexyl alcohol Nitric acid (60%) Sulfurous acid gas Aniline Cresol Hydrobromic acid Nitrobenzene Tarnic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tarnic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tarataric acid Animal oil (Lard oil) Cyclohexane Hydrocyanic acid Nitromethane Terpineol Aqua regia Cyclohexanol Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrachlyrofuran Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Barium sulfate Diisopropyl keton Isobutyl alcohol Perchlorate Tributyl phosphate Beer Dioctyl phthalate Isooctane Perchloroethylene Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzene (Benzol) Diphenyl vide Kerosene Picric acid Tung oil Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl benzoate Ethanolamine Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethyl acetate Lead sulfamate Potassium hydroxide Water Boric acid Ethyl acetate Lead sulfamate Potassium infarte Whiskey Bromine Ethyl acetate Lead sulfamane Potassium infarte Whiskey Bromine Ethyl acetate Lead sulfamonia Propyl acetate Zinc acetate Butter Ethyl collulose Lubricating oil Propyl acetate Zinc acetate	·	Coconut oil	Glue	Natrium peroxide	Styrene
Amyl alcohol Corn oil Hexaldehyde Nickel chloride Sulfur chloride Amyl borate Cottonseed oil Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Creosote oil Hexyl alcohol Nitro acid (60%) Amyl naphthalene Creosote oil Hexyl alcohol Nitro acid (60%) Aniline Cresol Hydrobromic acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tarnic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tarnic acid Aniline dye Cupric chloride Hydrochloric acid (49%) Nitropropane Tetrachloroethane Terpineol Cyclohexanol Hydrofluoric acid anhydrous Aspalat Cyclohexanol (Anon) Hydrofluoric acid anhydrous Aspalat Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrachlyrican Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium hydroxide Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributy phosphate Beer Dioctyl phthalate Isooccane Perchlorate Tributyp phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Siepropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethyl acetate Lead sulfamate Potassium chloride Water Boric acid Ethyl acetate Lead sulfamate Potassium permanganate Xylene Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Buther oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium permanganate Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acrylate Ethyl sordalete Ethyl sulficate	Ammonium sulfate	Copper cyanide	Glycerine	Natural gas	Sucrose solution
Amyl borate Cottonseed oil Hexane Nickel sulfate Sulfuric acid (98%) Amyl naphthalene Creosote oil Hexyl alcohol Nitric acid (60%) Sulfurous acid gas Aniline Cresol Hydrobromic acid Nitroenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitroenthane Tartaric acid Aniline dye Cupric chloride Hydrochloric acid Nitroenthane Tartaric acid Animal oil (Lard oil) Cyclohexane Hydrocyanic acid Nitroenthane Terpineol Aqua regia Cyclohexanol Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrathyl lead Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrathyl read Barium chloride Dichlorobenzene Hydroguinone Ozone Thionyl chloride Barium sulfate Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphate Beer Dioctyl phthalate Isooctane Perchlorate Tributoxy ethyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl benzoate Ethyl acetate Lead sulfamate Potassium hydroxide Water Borax Ethyl acetate Lead sulfamate Potassium pramaganate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium pramaganate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium pramaganate Ethyl coholide Magnesium hydroxide Propyl alcohol Zinc chloride Butlane Ethyl coholide Magnesium nurloride Propyl alcohol Zinc chloride Butyl acrylate Ethyl solloride Magnesium nurloride Propyl alcohol Zinc chloride	Amyl acetate	Copper sulfate	Grease	Nickel acetate	Sulfur
Amiline Cresote oil Hexyl alcohol Nitric acid (60%) Sulfurous acid gas Aniline Cresol Hydrobromic acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tannic acid Tartaric acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tartaric acid Tartaric acid Nitromethane Terpineol Cyclohexane Hydrocyanic acid Nitromethane Terpineol Nitropropane Tetrachloroethane Acyan regia Cyclohexanol Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Octyl alcohol Tetraethyl lead Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrahydrofuran Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfate Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Barium sulfate Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphate Beer Dioctyl phthalate Isooctane Perchlorethylene Tributory ethyl phosphate Beer Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzene (Benzol) Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium permanganate Vinegar Boria acid Ethyl acetate Linolenic acid Potassium permanganate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Zeolite Butane Ethyl alcohol Liquid ammonia Potassium permanganate Zeolite Butane Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acrylate Ethyl chloride Magnesium hydroxide Propyl alcohol Zinc chloride Butyl acrylate Ethyl scloride Magnesium chloride Propyl alcohol Zinc chloride	Amyl alcohol		Hexaldehyde	Nickel chloride	Sulfur chloride
Aniline Cresol Hydrobromic acid Nitrobenzene Tannic acid Aniline dye Cupric chloride Hydrochloric acid Nitrobenzene Tantaric acid Animal oil (Lard oil) Cyclohexane Hydrocyanic acid Nitrobenzene Terpineol Hydrocyanic acid Nitrobenzene Terpineol Terpineol Aqua regia Cyclohexanol Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Octyl alcohol Tetrabydrofuran Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrahydrofuran Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium hydroxide Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphate Beer Dioctyl phthalate Isooctane Perchloroethylene Tributyl phosphate Beer Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Pesasyl chloride Ethyl acetate Lead sulfamate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium hydroxide Water Boric acid Ethyl acetoacetate Linolenic acid Potassium premanganate Xylene Bunker oil Ethyl alcohol Liquid ammonia Potassium premanganate Xylene Butyl acetate Ethyl cellulose Lubricating oil Propyl alcohol Zinc chloride Butyl acetate Ethyl cellulose Lubricating oil Propyl alcohol Zinc chloride Butyl acetate Ethyl cellulose Magnesium hydroxide Propyl alcohol Zinc chloride Butyl acrylate Ethyl cilidee Magnesium sulfate Propyl alcohol Zinc chloride Butyl acrylate Ethyl silicate Magnesium sulfate Propyl alcohol Zinc chloride	Amyl borate	Cottonseed oil	Hexane	Nickel sulfate	Sulfuric acid (98%)
Anilline de Cresol Hydrobromic acid Nitrobenzene Tannic acid Anilline dye Cupric chloride Hydrochloric acid Nitroethane Tartaric acid Animal oil (Lard oil) Cyclohexane Hydrocyanic acid Nitromethane Terpineol Aqua regia Cyclohexanol Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Octyl alcohol Tetraethyl lead Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrahydrofuran Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium sulfate Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfate Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphat Beer Dioctyl phthalate Isocotane Perchlororethylene Tributoyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl actate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Vegetable oil Benzyl chloride Ethyl acetate Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium hydroxide Water Boric acid Ethyl acetoacetate Linolenic acid Potassium premanganate Xylene Bunker oil Ethyl alcohol Liquid ammonia Potassium premanganate Xylene Buther Ethyl alcohol Liquid ammonia Potassium premanganate Xylene Buther Ethyl alcohol Liquid ammonia Potassium premanganate Xylene Ethyl alcohol Liquid ammonia Potassium premanganate Zeolite Buthane Ethyl cellulose Lubricating oil Propyl alcohol Zinc chloride Butyl acrylate Ethyl oxalate Magnesium hydroxide Propyl alcohol Zinc chloride Butyl acrylate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide	Amyl naphthalene	Creosote oil	Hexyl alcohol	Nitric acid (60%)	Sulfurous acid gas
Animal oil (Lard oil) Aqua regia Cyclohexanol Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Cycly alcohol Tetraethyl lead Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Diethyl sebacate Hydrogen sulfide Dycone Barium hydroxide Diethylene glycol Hydrofluorious acid Hydrogen sulfide Dycone Thionyl chloride Barium sulfate Diethylene glycol Hydroquinone Ozone Thionyl chloride Barium sulfate Diisopropyl keton Barium sulfide Diisopropyl keton Dioctyl phthalate Isooctane Perchlorate Tributoxy ethyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Benzene (Benzol) Diphenyl Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Turgentine oil Benzyl benzoate Ethanolamine Lead acetate Potassium chloride Vegetable oil Benzay Ethyl acetate Linolenic acid Potassium hydroxide Butker Butker Ethyl alcohol Liquid ammonia Propyl acetate Ethyl cellulose Lubricating oil Magnesium hydroxide Propyl alcohol Zinc sulfide Diitricethyl Tetrachloroethylene Tetrachloroethylene Tetrachloroethylene Tetrachloroethylene Tetrachloroethylene Tetrachloroethylene Tetrachloroethylene Tributoxy ethyl phosphate Perchlorate Tributoxy ethyl phosphate Trichloroethylene Trichloroethylene		Cresol	Hydrobromic acid	Nitrobenzene	Tannic acid
Aqua regia Cyclohexanol Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Octyl alcohol Tetraethyl lead Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrahydrofuran Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium hydroxide Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphate Beer Dioctyl phthalate Isocctane Perchloroethylene Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Boric acid Ethyl acetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acetate Linolenic acid Potassium permanganate Xylene Bunker oil Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl choride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium hydroxide Propyl alcohol Zinc chloride Butyl acrylate Ethyl silicate Magnesium hydroxide Propyl alcohol Zinc chloride Butyl acrylate Ethyl silicate Magnesium hydroxide Propyl alcohol Zinc chloride	Aniline dye	Cupric chloride	Hydrochloric acid	Nitroethane	Tartaric acid
Aqua regia Cyclohexanol Hydrofluoric acid (49%) Nitropropane Tetrachloroethane Arsenic acid Cyclohexanone (Anon) Hydrofluoric acid anhydrous Octyl alcohol Tetraethyl lead Phydrofluoric acid anhydrous Octyl alcohol Tetraethyl lead Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrahydrofuran Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Diethyl sebacate Hydrogen sulfide Oxygen Tetralin Diethyl sebacate Hydrogen sulfide Oxygen Thionyl chloride Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Tributoxy ethyl phosphate Diethyl sebacate Isopropyl alcohol Perchlorate Tributoxy ethyl phosphate Beer Dioctyl phthalate Isocctane Perchloroethylene Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzane Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Boric acid Ethyl acetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acetoacetate Linolenic acid Potassium permanganate Xylene Bunker oil Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl alcohol Liquid ammonia Potassium permanganate Zeolite Butane Ethyl cellulose Lubricating oil Propyl alcohol Zinc chloride Butyl acetate Ethyl chloride Magnesium hydroxide Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propyl alcohol Zinc chloride Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Animal oil (Lard oil)	Cyclohexane	Hydrocyanic acid	Nitromethane	Terpineol
Asphalt Dibutyl phthalate Hydrogen peroxide (30%) Oxalic acid Tetrahydrofuran Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetralin Barium hydroxide Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphate Beer Dioctyl phthalate Isooctane Perchloroethylene Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Linolenic acid Potassium dichromate Vinegar Boric acid Ethyl acetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl alcohol Liquid ammonia Potassium pydroxide Water Bormine Ethyl alcohol Liquid ammonia Potassium sulfate Zeolite Buttane Ethyl cellulose Lubricating oil Propyl alcohol Zinc chloride Buttyl acetate Ethyl oxalate Magnesium chloride Propyl alcohol Zinc sulfide Butyl acetate Ethyl oxalate Magnesium hydroxide Propyl alcohol Zinc sulfide Butyl acetate Ethyl silicate Magnesium hydroxide Propylene Zinc sulfide		Cyclohexanol	Hydrofluoric acid (49%)	Nitropropane	Tetrachloroethane
Barium chloride Dichlorobenzene Hydrogen sulfide Oxygen Tetrallin Barium hydroxide Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphat Beer Dioctyl phthalate Isooctane Perchloroethylene Tributy phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl chloride Magnesium hydroxide Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propyl alcohol Zinc sulfide Butyl acetate Ethyl oxalate Magnesium hydroxide Propyl alcohol Zinc sulfide	Arsenic acid	Cyclohexanone (Anon)	Hydrofluoric acid anhydrous	Octyl alcohol	Tetraethyl lead
Barium hydroxide Diethyl sebacate Hydroquinone Ozone Thionyl chloride Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphat Beer Dioctyl phthalate Isoccane Perchloroethylene Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzaine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetoacetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium permanganate Xylene Bunker oil Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl chloride Magnesium hydroxide Propyl alcohol Zinc sulfide Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide	Asphalt	Dibutyl phthalate	Hydrogen peroxide (30%)	Oxalic acid	Tetrahydrofuran
Barium sulfate Diethylene glycol Hypochlorous acid Palmitic acid Triacetin Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphat Beer Dioctyl phthalate Isocctane Perchloroethylene Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetoacetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium pitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium premanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Buttane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium hydroxide Propyl alcohol Zinc chloride Butyl acrylate Ethyl silicate Magnesium hydroxide Propylene Zinc sulfide	Barium chloride	Dichlorobenzene	Hydrogen sulfide	Oxygen	Tetralin
Barium sulfide Diisopropyl keton Isobutyl alcohol Perchlorate Tributoxy ethyl phosphate Beer Dioctyl phthalate Isooctane Perchloroethylene Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Tricethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium hydroxide Water Boric acid Ethyl acetoacetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acylate Linseed oil Potassium itrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium sulfate Zeolite Butten Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl oxalate Magnesium chloride Propyl alcohol Zinc chloride Butyl acylate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium hydroxide Propylene Zinc sulfide	Barium hydroxide	Diethyl sebacate	Hydroquinone	Ozone	Thionyl chloride
Beer Dioctyl phthalate Isooctane Perchloroethylene Tributyl phosphate Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acylate Linseed oil Potassium permanganate Xylene Bunter oil Ethyl benzene LPG (Liquefied petroleum gas) Buttane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Buttyl acetate Ethyl oxalate Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium hydroxide Propylene Zinc sulfide	Barium sulfate	Diethylene glycol	Hypochlorous acid	Palmitic acid	Triacetin
Beet sugar liquors Dioctyl sebacate Isopropyl acetate Petroleum Trichloroethylene Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetate Linolenic acid Potassium mydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium nitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Buttyl acrylate Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acrylate Ethyl oxalate Magnesium sulfate Pyridine	Barium sulfide	Diisopropyl keton	Isobutyl alcohol	Perchlorate	Tributoxy ethyl phosphate
Benzaldehyde Dipentene (Limonene) Isopropyl alcohol Phenol Tricresyl phosphate Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetoacetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium nitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl choride Magnesium chloride Propyl alcohol Zinc chloride Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Beer	Dioctyl phthalate	Isooctane	Perchloroethylene	Tributyl phosphate
Benzine Diphenyl Isopropyl ether Phosphoric acid (75%) Triethanolamine Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetoacetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium nitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Beet sugar liquors	Dioctyl sebacate	Isopropyl acetate	Petroleum	Trichloroethylene
Benzene (Benzol) Diphenyl oxide Kerosene Picric acid Tung oil Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetoacetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium nitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Benzaldehyde	Dipentene (Limonene)	Isopropyl alcohol	Phenol	Tricresyl phosphate
Benzyl alcohol Epichlorohydrin Lead acetate Piperidine Turpentine oil Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium chloride Vinegar Borax Ethyl acetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium nitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Benzine	Diphenyl	Isopropyl ether	Phosphoric acid (75%)	Triethanolamine
Benzyl benzoate Ethanolamine Lead nitrate Potassium chloride Vegetable oil Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetoacetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium nitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Benzene (Benzol)	Diphenyl oxide	Kerosene	Picric acid	Tung oil
Benzyl chloride Ethyl acetate Lead sulfamate Potassium dichromate Vinegar Borax Ethyl acetoacetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium nitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Benzyl alcohol	Epichlorohydrin	Lead acetate	Piperidine	Turpentine oil
Borax Ethyl acetoacetate Linolenic acid Potassium hydroxide Water Boric acid Ethyl acrylate Linseed oil Potassium nitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Benzyl benzoate	Ethanolamine	Lead nitrate	Potassium chloride	Vegetable oil
Boric acid Ethyl acrylate Linseed oil Potassium nitrate Whiskey Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Benzyl chloride	Ethyl acetate	Lead sulfamate	Potassium dichromate	Vinegar
Bromine Ethyl alcohol Liquid ammonia Potassium permanganate Xylene Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Borax	Ethyl acetoacetate	Linolenic acid	Potassium hydroxide	Water
Bunker oil Ethyl benzene LPG (Liquefied petroleum gas) Potassium sulfate Zeolite Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Boric acid	Ethyl acrylate	Linseed oil	Potassium nitrate	Whiskey
Butane Ethyl cellulose Lubricating oil Propyl acetate Zinc acetate Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Bromine	Ethyl alcohol	Liquid ammonia	Potassium permanganate	Xylene
Butter Ethyl chloride Magnesium chloride Propyl alcohol Zinc chloride Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Bunker oil	Ethyl benzene	LPG (Liquefied petroleum gas)	Potassium sulfate	Zeolite
Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Butane	Ethyl cellulose	Lubricating oil	Propyl acetate	Zinc acetate
Butyl acetate Ethyl oxalate Magnesium hydroxide Propylene Zinc sulfide Butyl acrylate Ethyl silicate Magnesium sulfate Pyridine	Butter	Ethyl chloride	Magnesium chloride	Propyl alcohol	Zinc chloride
	Butyl acetate	Ethyl oxalate	-	Propylene	Zinc sulfide
Buttel clockel (Buttenel) Ethylene chlorobydyin Malaia asid Durrele	Butyl acrylate	Ethyl silicate	Magnesium sulfate		
Dulyi alconol (Dulanol) Elilyiene Chloronyarin Maielc acid Pyrrole	Butyl alcohol (Butanol)	Ethylene chlorohydrin	Maleic acid	Pyrrole	

Note 1) "Chemically inert" means - not to cause any chemical reaction.

Note 2) The data above is based on the information presented by the material manufacturers.

Note 3) The applicable fluid list provides reference values as a guide only, therefore we do not guarantee the application to our product.

Note 4) SMC is not responsible for its accuracy and any damage happened because of this data.



Chemical Resistance of Fluoropolymer FEP Material

Chemicals in the list below are chemically inert Note 1) to FEP material, however physical properties may be effected by temperature or pressure change.

Please make sure that operating conditions do not cause problems since the use of FEP tubing under chemical environment is unsecured.

2-nitro-2-methyl propanol	Chloroform	Nitromethane
2-nitrobutanol	Paraffinum liquidum	Perchloroethylene
Pentabasic benzamide	Allyl acetate	Perphloroxylene
N-butylamine	Ethyl acetate	Unsymmetrical dimethylhydrazine
N-octadecanol	Potassium	Hydrazine
N-butyl acetate	Butyl acetate	Pinene
O-cresol	Sodium hypochlorite	Piperidine
Di-isobutyl adipate	Carbon tetrachloride	Glacial acetic acid (Acetic acid)
Acetophenone	Dioxane	Pyridine
Acetone	Cyclohexanone	Phenol
Alniline	Cyclohexane	Phthalic acid
Abietic acid	Dimethyl ether	Dybutyl phthalate
Sulfuric chloride	Dimethylsulfoxide	Dimethyl phthalate
Isooctane	Dimethylformamide	Hydrofluoric acid
Liquid ammonia	Bromine	Naphthalene fluoride
Ethyl alcohol	DI water (Pure water)	Nitrobenzene fluoride
Ethyl ether	Nitric acid	Furan
Ethylene glycol	Mercury	Hexachlorethane
Ethylenediamine	Ammonium hydroxide	Hexane
Zinc chloride	Potassium hydroxide	Ethyl hexanoate
Aluminum chloride	Sodium hydroxide	Phenylcarbinol
Ammonium chloride	Cetane	Benzaldehyde
Calcium chloride	Soap, detergent	Benzonitrile
Sulfuric chloride	Dibutyl sebacate	Borax
Iron chloride (III)	Diethyl carbonate	Boric acid
Benzoyl chloride	Tetrachloroethylene	Formic aldehyde (Formalin)
Magnesium chloride	Tetrahydrofuran	Acrylic anhydride
Hydrochloric acid	Tetrabromoethane	Acetic anhydride
Chlorine (absolute)	Triethanolamine	Methacrylic acid
Aqua regia	Trichloroethylene	Allyl methacrylate
Ozone	Trichloroacetic acid	Vinyl methacrylate
Hydrogen peroxide	Toluene	Methyl alcohol
Natrium peroxide	Naphtha	Methyl ethyl ketone
Gasoline	Naphthalene	Methylene chloride
Permanganate	Naphthol	Sulphuric acid
Formic acid	Lead	Phosphoric acid
Xylene	Carbon dioxide	Iron phosphate (III)
Chromic acid	Nitrogen dioxide	Tri-n-butyl phosphate
Chlorosulfonic acid	Nitrobenzene	Tricresyl phosphate

Note 1) "Chemically inert" means - not to cause any chemical reaction.

Teflon® is a registered trademark for the fluoropolymer produced by E.I du Pond de Nemours & Company (Inc.) and Du Pond-Mitsui Fluorochemicals Co., Ltd.



MQR

IDK

KQ2 KQB2

KM KF

H/DL L/LL KC KK KK130 DM KDM **KB** KR KA KOG2 KG KFG2 MS KKA KΡ L₀

Note 2) The data above is based on the information presented by the material manufacturers.

Note 3) The applicable fluid list provides reference values as a guide only, therefore we do not guarantee the application to our product.

Note 4) SMC is not responsible for its accuracy and any damage happened because of this data.

Reference cited: Teflon®, the fluoropolymer handbook, Manual for the chemical applications of Teflon®. Du Pond-Mitsui Fluorochemicals



TL/TIL/TLM/TILM/TH/TIH/TD/TID Series Tubing/Precautions

Be sure to read this before handling the products.

Selection

⚠ Warning

1. Confirm the specifications.

Products represented in this catalog are designed only for use in compressed air systems (including vacuum).

Do not operate at pressures or temperatures, etc., beyond the range of specifications, as this can cause damage or malfunction. (Refer to the specifications.)

2. In case of using the product for medical care

This product is designed for use with compressed air system applications for medical care purposes. Do not use in contact with human bodily fluids, body tissues or transfer applications to a human living body.

↑ Caution

1. Do not use in locations where the connecting threads and tubing connection will slide or rotate.

The connecting threads and tubing connection will come apart under these conditions.

- Use tubing at or above the minimum bending radius. Using below the minimum bending radius can cause breakage or flattening of the tubing.
- Never use the tubing for anything flammable, explosive or toxic such as gas, fuel gas, or cooling mediums etc.

Because the contents may penetrate outward.

4. Use the fittings applicable to the tubing size.

Mounting

1. Confirm model no., size, etc. before installing.

Check tubing for damage, gouges, cracks, etc.

The fluoropolymer tubing do not have the model number displayed on the product due to the resin material used. If tubing without a model label is mixed with other tubing which also does not have a model label, it is impossible to identify the model. Please avoid mixing the products with other models while it is being used and/or stored.

- When tubing is connected, consider factors such as changes in the tubing length due to pressure, and allow sufficient leeway.
- Do not apply unnecessary forces such as twisting, pulling, moment loads, etc. on fittings or tubing.

This will cause damage to fittings and will crush, burst or release tubing.

Mount so that tubing is not damaged due to tangling and abrasion.

This can cause flattening, bursting or disconnection of tubing, etc.

Piping

∧ Caution

1. Preparation before piping

Before piping is connected, it should be thoroughly blown out with air (flushing) or washed to remove chips, cutting oil and other debris from inside the pipe. Not allowing chips of the piping thread or the seal material to go in.

Air Supply

.⚠Warning

1. Types of fluid

This product is designed for use with compressed air.

2. In case of excessive condensation

Excessive condensation in a compressed air system may cause pneumatic equipment to malfunction. Installation of an air dryer, water separator before filter is recommended.

3. Drain flushing

If condensation in the drain bowl is not emptied on a regular basis, the bowl will overflow and allow the condensation to enter the compressed air lines. It causes malfunction of pneumatic devices.

if the drain bowl is difficult to check and remove, installation of a drain bowl with an auto drain option is recommended. For compressed air quality, refer to SMC's "Air Cleaning Equipment" catalog.

Operating Environment

⚠ Warning

- 1. Do not use in locations having an explosive atmosphere.
- Do not operate in locations where vibration or impact occurs.
- In locations near heat sources, block off radiated heat.

Maintenance

⚠ Caution

- Reform periodic inspections to check the following problems and replace tubing, if necessary.
 - 1) Cracks, gouges, wearing, corrosion
 - 2) Air leakage
 - 3) Twists or crushing of tubing
- 4) Hardening, deterioration, softening of tubing
- Do not repair or patch the replaced tubing or fittings for reuse.
- When using insert or miniature fittings over a long period, some leakage may occur due to age deterioration of the materials. If any leakage is detected, correct the problem by additional tightening.

If tightening becomes ineffective, replace the fittings with a new product immediately.