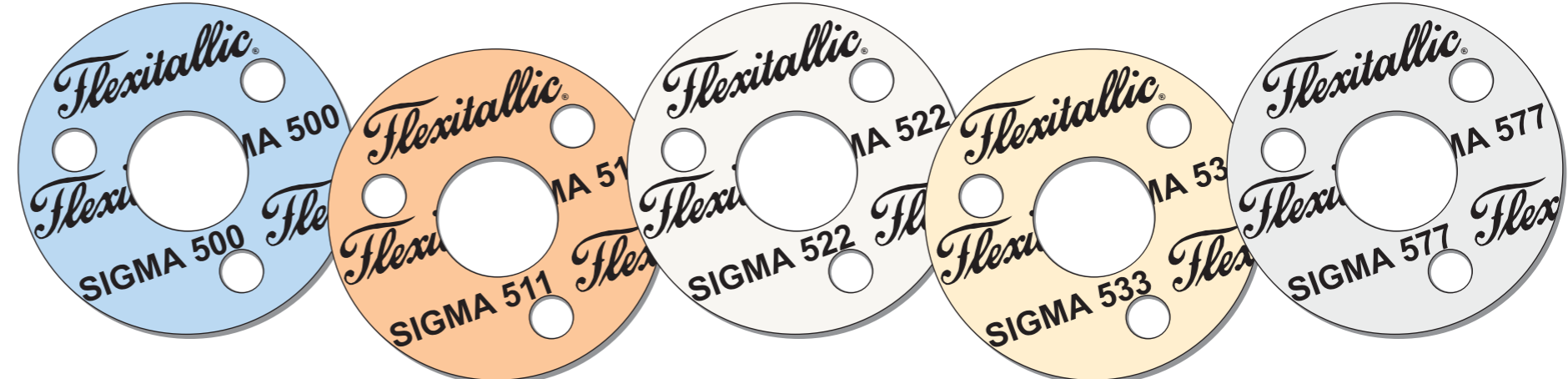


The image features a dark green background with a repeating diamond plate pattern. In the center, the text 'S+G MMA' is displayed in a light green, bold, sans-serif font. The '+' sign is positioned between the 'S' and 'G'. To the right of the text, there are two large, semi-transparent green circles. The overall aesthetic is industrial and modern.

**S+G MMA**



**Sheet Sizes:**

60" x 60"

Other sizes available on request.

**Thicknesses:**

1/32", 1/16", 1/8"

Other thicknesses available on request.

**Recommended Surface Finish:**

125 - 250 µin

The data in this document relates to the material as supplied and should be used for guidance purposes only. The information herein is given in good faith but no liability will be accepted by the Company in relation to the same. The Company does not give any warranty that the product will be suitable for the use intended by the customer.

	<b>Material: Description:</b>	<b>SIGMA 500<sup>®</sup> PTFE, Glass Microspheres</b>	<b>SIGMA 511<sup>®</sup> PTFE, Silica</b>	<b>SIGMA 522<sup>®</sup> PTFE, Barium Sulfate</b>	<b>SIGMA 533<sup>®</sup> PTFE Barium Sulfate</b>	<b>SIGMA 577<sup>®</sup> PTFE, Silica</b>
<b>Service &amp; Application:</b>		<ul style="list-style-type: none"> <li>Moderate concentrations of acids &amp; caustics, chlorine, hydrogen peroxide</li> <li>Enhanced compressibility for low bolt loads &amp; glass-lined flanges</li> <li>Available without pigment - Sigma 501</li> </ul>	<ul style="list-style-type: none"> <li>Strong acids (except hydro-fluoric) to general chemicals</li> </ul>	<ul style="list-style-type: none"> <li>Sigma 533 core with micro-cellular PTFE faces</li> <li>Low bolt loads; warped or glass lined flanges</li> </ul>	<ul style="list-style-type: none"> <li>Strong caustics to general chemicals; chlorine</li> <li>Aqueous hydrofluoric acid below 49%</li> </ul>	<ul style="list-style-type: none"> <li>Sigma 511 core with micro-cellular PTFE faces</li> <li>Low bolt loads; warped or glass lined flanges</li> </ul>
<b>Special Features:</b>	<ul style="list-style-type: none"> <li>Sigma 500, 511, and 533 feature biaxially-oriented PTFE with a selected filler to achieve maximum reduction of creep.</li> <li>All components in Sigma are FDA compliant.</li> <li>All Sigma products are available for oxygen service upon request.</li> </ul>					
<b>Properties:</b>						
Thickness	in	1/32	1/32	1/16	1/32	1/16
Density	lb/ft <sup>3</sup> (g/cc)	87 (1.4)	137 (2.2)	125 (2.0)	180 (2.9)	98 (1.6)
ASTM F36 Compressibility	%	42	10	30	11	33
ASTM F36 Recovery	%	40	44	25	46	25
ASTM F152 Cross Grain Tensile Strength	psi (MPa)	1740 (12.0)	2175 (15.0)	1479 (10.2)	2260 (15.6)	1305 (9.0)
ASTM F38-B Creep Relaxation	%	21.2	23.9	48	16.8	42
ASTM F37-A Sealability (Fuel A 10 psi; Gskt Stress 1000 psi)	mL/hr	0.12	0.42	0.66	0.42	0.66
ASTM F146						
Thickness Increase Oil #3 @ 300°F	%	1	1	1	1	1
Thickness Increase Fuel B @ 70 - 85°F	%	2	1	1	1	1
Weight Increase Oil #3 @ 300°F	%	3	2	12	1	12
Weight Increase Fuel B @ 70 - 85°F	%	4	3	4	2	4
BS 7531 Nitrogen Gas Permeability	mL/min	0.02	0.01	0.00	0.01	0.00
<b>Gasket Constants:</b>						
ASME m		1.4	1.4	1.4	1.4	1.4
ASME y	psi (MPa)	1885 (13.0)	2320 (16.0)	1885 (13.0)	2320 (16.0)	1885 (13.0)
PVRC Gb <sup>1</sup>	psi (MPa)	4	209	472	115	-
PVRC a <sup>1</sup>		0.804	0.356	0.25	0.382	-
PVRC Gs <sup>1</sup>	psi (MPa)	0.115	0.00498	0.0370	0.000065	-
<b>Product Designation:</b>						
ASTM F104 Line Callout		F452140M5	452110E11M6	455120E12M4	452110E11M6	455120E12M4
<b>Service Parameters:</b>						
pH Range		0 - 14	0 - 14	0 - 14	0 - 14	0 - 14
Maximum Temperature <sup>2</sup> (@ minimum thickness)	°F (°C)	500 (260)	500 (260)	500 (260)	500 (260)	500 (260)
Maximum Pressure <sup>2</sup>	psi (bar)	1235 (8.5)	1235 (8.5)	1235 (8.5)	1235 (8.5)	1235 (8.5)

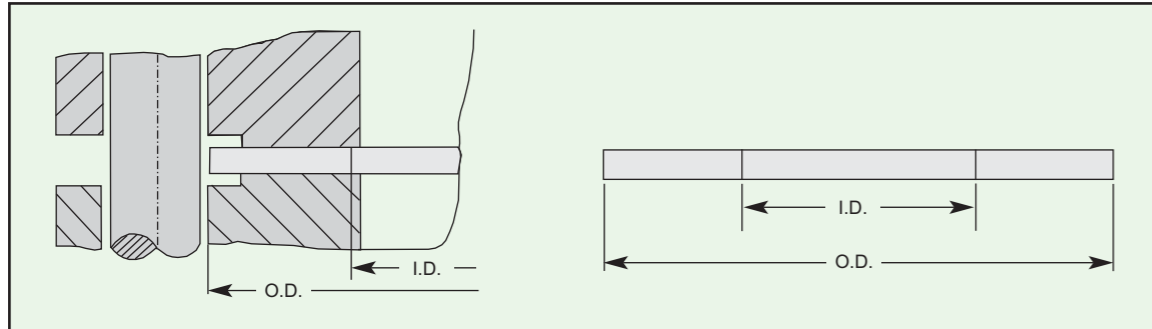
<sup>1</sup> 1/16"

<sup>2</sup> Maximum temp/pressure combinations cannot be used simultaneously.

## Flat Sheet Gaskets - Dimensional Data

### Flat Ring Gaskets to ASME B16.21

To Suit ASME B16.5 & BS 1560 Flanges



NPS	Inside Diameter		Outside Diameter											
			Class 150		Class 300		Class 400		Class 600		Class 900		Class 1500*	
			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
1/2	21.4	27/32	47.6	1-7/8	54	2-1/8	54.0	2-1/8	54.0	2-1/8	63.5	2-1/2	63.5	2-1/2
3/4	27.0	1-1/16	57.2	2-1/4	66.7	2-5/8	66.7	2-5/8	66.7	2-5/8	69.9	2-3/4	69.9	2-3/4
1	33.3	1-5/16	66.7	2-5/8	73.0	2-7/8	73.0	2-7/8	73.0	2-7/8	79.4	3-1/8	79.4	3-1/8
1-1/4	42.1	1-21/32	76.2	3	82.6	3-1/4	82.6	3-1/4	82.6	3-1/4	88.9	3-1/2	88.9	3-1/2
1-1/2	48.4	1-29/32	85.7	3-3/8	95.3	3-3/4	95.3	3-3/4	95.3	3-3/4	98.4	3-7/8	98.4	3-7/8
2	60.3	2-3/8	104.8	4-1/8	111.1	4-3/8	111.1	4-3/8	111.1	4-3/8	142.9	5-5/8	142.9	5-5/8
2-1/2	73.0	2-7/8	123.8	4-7/8	130.2	5-1/8	130.2	5-1/8	130.2	5-1/8	165.1	6-1/2	165.1	6-1/2
3	88.9	3-1/2	136.5	5-3/8	149.2	5-7/8	149.2	5-7/8	149.2	5-7/8	168.3	6-5/8	174.6	6-7/8
3-1/2	101.6	4	161.9	6-3/8	165.1	6-1/2	161.9	6-3/8	161.9	6-3/8	-	-	-	-
4	114.3	4-1/2	174.6	6-7/8	181.0	7-1/8	177.8	7	193.7	7-5/8	206.4	8-1/8	209.6	8-1/4
5	141.3	5-9/16	196.9	7-3/4	215.9	8-1/2	212.7	8-3/8	241.3	9-1/2	247.7	9-3/4	254.0	10
6	168.3	6-5/8	222.3	8-3/4	250.8	9-7/8	247.7	9-3/4	266.7	10-1/2	288.9	11-3/8	282.6	11-1/8
8	219.1	8-5/8	279.4	11	308.0	12-1/8	304.8	12	320.7	12-5/8	358.8	14-1/8	352.4	13-7/8
10	273.1	10-3/4	339.7	13-3/8	361.9	14-1/4	358.8	14-1/8	400.0	15-3/4	435.0	17-1/8	435.0	17-1/8
12	323.9	12-3/4	409.6	16-1/8	422.3	16-5/8	419.1	16-1/2	457.2	18	498.5	19-5/8	520.7	20-1/2
14	355.6	14	450.8	17-3/4	485.8	19-1/8	482.6	19	492.1	19-3/8	520.7	20-1/2	577.8	22-3/4
16	406.4	16	514.3	20-1/4	539.7	21-1/4	536.6	21-1/8	565.1	22-1/4	574.7	22-5/8	641.3	25-1/4
18	457.2	18	549.3	21-5/8	596.9	23-1/2	593.7	23-3/8	612.8	24-1/8	638.2	25-1/8	704.8	27-3/4
20	508.0	20	606.4	23-7/8	654.0	25-3/4	647.7	25-1/2	682.6	26-7/8	698.5	27-1/2	755.6	29-3/4
24	609.6	24	717.5	28-1/4	774.7	30-1/2	768.3	30-1/4	790.6	31-1/8	838.2	33	901.7	35-1/2

\* Class 1500 rating is no longer specified in ASME B16.21.

Note:  
Flexitallic recommends the use of sheet gaskets for Class 150 & 300 flanges only.

## Flat Ring Gaskets to ASME B16.21

To Suit Large Diameter ASME B16.47 Series A (MSS-SP44) Flanges

NPS	Class 150		Class 300		Class 400		Class 600		Class 900*	
	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID
22	26	22	27-3/4	22	27-5/8	22	28-7/8	22	-	-
24	28-1/4	24	30-1/2	24	30-1/4	24	31-1/8	24	33	24
26	30-1/2	26	32-7/8	26	32-3/4	26	34-1/8	26	34-3/4	26
28	32-3/4	28	35-3/8	28	35-1/8	28	36	28	37-1/4	28
30	34-3/4	30	37-1/2	30	37-1/4	30	38-1/4	30	39-3/4	30
32	37	32	39-5/8	32	39-1/2	32	40-1/4	32	42-1/4	32
34	39	34	41-5/8	34	41-1/2	34	42-1/4	34	44-3/4	34
36	41-1/4	36	44	36	44	36	44-1/2	36	47-1/4	36
38	43-3/4	38	41-1/2	38	42-1/4	38	43-1/2	38	47-1/4	38
40	45-3/4	40	43-7/8	40	44-5/8	40	45-1/2	40	49-1/4	40
42	48	42	45-7/8	42	46-3/8	42	48	42	51-1/4	42
44	50-1/4	44	48	44	48-1/2	44	50	44	53-7/8	44
46	52-1/4	46	50-1/8	46	50-3/4	46	52-1/4	46	56-1/2	46
48	54-1/2	48	52-1/8	48	53	48	54-3/4	48	58-1/2	48
50	56-1/2	50	54-1/4	50	55-1/4	50	57	50	-	-
52	58-3/4	52	56-1/4	52	57-1/4	52	59	52	-	-
54	61	54	58-3/4	54	59-3/4	54	61-1/4	54	-	-
56	63-1/4	56	60-3/4	56	61-3/4	56	63-1/2	56	-	-
58	65-1/2	58	62-3/4	58	63-3/4	58	65-1/2	58	-	-
60	67-1/2	60	64-3/4	60	66-1/4	60	67-3/4	60	-	-

DIMENSIONS IN INCHES

\*CLASS 900 RATING IS NO LONGER SPECIFIED IN ASME B16.21

## Flat Ring Gaskets to ASME B16.21

To Suit Large Diameter ASME B16.47 Series B (API 605) Flanges

NPS	Class 75		Class 150		Class 300		Class 400		Class 900*	
	OD	ID	OD	ID	OD	ID	OD	ID	OD	ID
26	27-7/8	26	28-9/16	26	30-3/8	26	29-3/8	26	30-1/8	26
28	29-7/8	28	30-9-16	28	32-1/2	28	31-1/2	28	32-1/4	28
30	31-7/8	30	32-9-16	30	34-7/8	30	33-3/4	30	34-5/8	30
32	33-7/8	32	34-11-16	32	37	32	35-7/8	32	36-3/4	32
34	35-7/8	34	36-13-16	34	39-1/8	34	37-7/8	34	39-1/4	34
36	38-5-16	36	38-7/8	36	41-1/4	36	40-1/4	36	41-1/4	36
38	40-5-16	38	41-1/8	38	43-1/4	38	-	-	-	-
40	42-5-16	40	43-1/8	40	45-1/4	40	-	-	-	-
42	44-5-16	42	45-1/8	42	47-1/4	42	-	-	-	-
44	46-1/2	44	47-1/8	44	49-1/4	44	-	-	-	-
46	48-1/2	46	49-7-16	46	51-7/8	46	-	-	-	-
48	50-1/2	48	51-7-16	48	53-7/8	48	-	-	-	-
50	52-1/2	50	53-7-16	50	55-7/8	50	-	-	-	-
52	54-5-8	52	55-7-16	52	57-7/8	52	-	-	-	-
54	56-5-8	54	57-5-8	54	61-1/4	54	-	-	-	-
56	58-7-8	56	59-5-8	56	62-3/4	56	-	-	-	-
58	60-7-8	58	62-3-16	58	65-3-16	58	-	-	-	-
60	62-7-8	60	64-3-16	60	67-1-8	60	-	-	-	-

DIMENSIONS IN INCHES

\*CLASS 900 RATING IS NO LONGER SPECIFIED IN ASME B16.21



# Chemical Resistance Chart

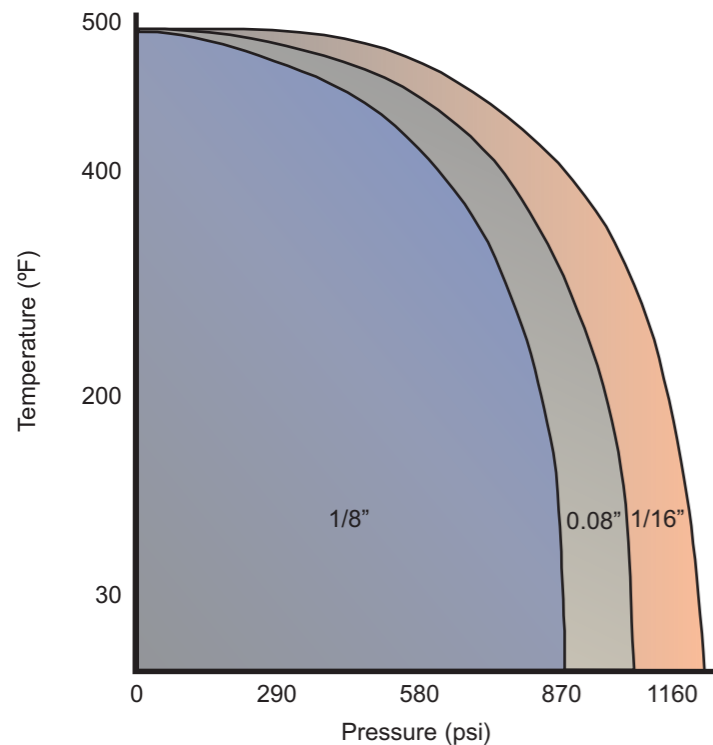
LEGEND:  
 Y = Suitable for Application  
 O = Suitability Depends On Operating Conditions  
 N = Not Suitable

## Pressure Containment and Temperature

NOTE: Pressure/temperature cannot be used simultaneously.

### Sigma 500, 511, 522, 533 and 577

Thickness (in.)	Max. Temperature (°F)	Max. Pressure (psi)
up to 1/16	500	1235
0.08	500	1015
1/8	500	870



	500	511 577	522 533
Acetic acid glacial	Y	Y	Y
Acetone	Y	Y	Y
Acetylene	Y	Y	Y
Acrylic acid	Y	Y	Y
Acrylonitrile	Y	Y	Y
Air	Y	Y	Y
Alkaline lye	Y	Y	Y
Aluminum chloride	Y	Y	Y
Ammonia gas	Y	Y	Y
Ammonia	Y	Y	Y
Amyl acetate	Y	Y	Y
Amyl alcohol	Y	Y	Y
Aniline	Y	Y	Y
Aqua-regia	Y	Y	Y
Aviation fuel	Y	Y	Y
Beer	Y	Y	Y
Benzene	Y	Y	Y
Benzoyl chloride	Y	Y	Y
Biphenyl	Y	Y	Y
Blast furnace gas	Y	Y	Y
Bleach (solution)	Y	Y	Y
Boiler feed water	Y	Y	Y
Brine	Y	Y	Y
Bromine	Y	Y	Y
n-butyl acetate	Y	Y	Y
Calcium chlorate	Y	Y	Y
Capro-lactam	Y	Y	Y
Carbolic Acid	Y	Y	Y
Carbon dioxide	Y	Y	Y
Carbon disulphide	Y	Y	Y
Carbon monoxide	Y	Y	Y
Carbon tetrachloride	Y	Y	Y
Chile saltpetre	Y	Y	Y
Chlorine dry	Y	Y	Y
Chlorine wet	Y	Y	Y
Chlorinated hydrocarbons	Y	Y	Y
Chloroacetic acid	Y	Y	Y
Chloro benzene	Y	Y	Y
Chromic acid	Y	Y	Y
Copper sulphate	Y	Y	Y
Creosote	Y	Y	Y
Cresol	Y	Y	Y
Crude oil	Y	Y	Y
Cyclohexanol	Y	Y	Y
1,4-Dichlorobenzene	Y	Y	Y
Diesel Oil	Y	Y	Y
Dowtherm	Y	Y	Y
Dye Liquor	Y	Y	Y
Ethyl acetate	Y	Y	Y
Ethyl alcohol	Y	Y	Y
Ethylene glycol	Y	Y	Y
Ethylene oxide	Y	Y	Y

	500	511 577	522 533
Ethyl ether	Y	Y	Y
Ethylene	Y	Y	Y
Ethylene chloride	Y	Y	Y
Fatty acids	Y	Y	Y
Ferric chloride	Y	Y	Y
Fluorine	N	N	N
Fluorosilicic acid	Y	Y	Y
Formaldehyde	Y	Y	Y
Formic acid 85%	Y	Y	Y
Formic acid 10%	Y	Y	Y
Freons	Y	Y	Y
Gas oil	Y	Y	Y
Gasoline	Y	Y	Y
Heating oil	Y	Y	Y
Hydraulic oil (glycol)	Y	Y	Y
Hydraulic oil (mineral)	Y	Y	Y
Hydraulic oil (phosphate ester)	Y	Y	Y
Hydrazine	Y	Y	Y
Hydrocarbons (aromatic)	Y	Y	Y
Hydrocarbons aliphatic (sat.)	Y	Y	Y
Hydrocarbons aliphatic (unsat.)	Y	Y	Y
Hydrochloric acid (37% HCl)	Y	Y	Y
Hydrofluoric acid	N	N	O
Hydrogen	Y	Y	Y
Hydrogen chloride	Y	Y	Y
Hydrogen fluoride	N	N	O
Hydrogen peroxide	Y	Y	Y
Hydrogen sulfide	Y	Y	Y
Isopropyl acetate	Y	Y	Y
Isopropyl alcohol	Y	Y	Y
Kerosene	Y	Y	Y
Lime	Y	Y	Y
Lubrication oil	Y	Y	Y
Machine oil	Y	Y	Y
Magnesium sulphate	Y	Y	Y
Malic acid	Y	Y	Y
Methane	Y	Y	Y
Methyl acrylate	Y	Y	Y
Methyl alcohol	Y	Y	Y
Methyl isobutyl ketone	Y	Y	Y
Methyl methacrylate	Y	Y	Y
Methylene chloride	Y	Y	Y
Mineral oil	Y	Y	Y
Mobiltherm	Y	Y	Y
Naphthalene	Y	Y	Y
Natural gas	Y	Y	Y
Nitric acid (concentrated 50%)	Y	Y	Y
Nitric acid (fuming 95%)	Y	Y	Y
Nitrogen	Y	Y	Y
Oleum	Y	Y	N
Oxygen	Y	Y	Y
Paraffin	Y	Y	Y

	500	511 577	522 533
Pentachlorophenol	Y	Y	Y
Perchloric acid	Y	Y	Y
Petroleum	Y	Y	Y
Phenol	Y	Y	Y
Phosgene	Y	Y	Y
Phosphoric acid (concentrated)	O	O	Y
Phosphoric acid (dilute)	Y	Y	Y
Phosphorous	Y	Y	Y
Phthalic anhydride	Y	Y	Y
Potassium hydroxide	O	O	Y
Potassium nitrate	Y	Y	Y
Potassium permanganate	Y	Y	Y
Producer gas	Y	Y	Y
Pyridine	Y	Y	Y
Sea water	Y	Y	Y
Silicone oil	Y	Y	Y
Soda ash	Y	Y	Y
Sodium bi-carbonate	Y	Y	Y
Sodium carbonate	Y	Y	Y
Sodium cyanide	Y	Y	Y
Sodium hydroxide (40%)	O	N	Y
Sodium hydroxide (dilute)	Y	Y	Y
Sodium hypochlorite	Y	Y	Y
Sodium nitrate	Y	Y	Y
Starch	Y	Y	Y
Steam	Y	Y	Y
Steam condensate	Y	Y	Y
Styrene	Y	Y	Y
Sulphur	Y	Y	Y
Sulphur dioxide	Y	Y	Y
Sulphur trioxide	Y	Y	Y
Sulphuric acid (concentrated)	Y	Y	O
Sulphuric acid (fuming)	O	Y	N
Tar	Y	Y	Y
Turpentine	Y	Y	Y
Toluene	Y	Y	Y
Towns gas	Y	Y	Y
Transformer oil	Y	Y	Y
Tributyl phosphate	Y	Y	Y
Triethanolamine	Y	Y	Y
Urea	Y	Y	Y
Vegetable Oil	Y	Y	Y
Vinyl acetate	Y	Y	Y
Vinyl chloride	Y	Y	Y
Vinylidene chloride	Y	Y	Y
Water	Y	Y	Y
Water condensate	Y	Y	Y
Water distilled	Y	Y	Y
Whisky	Y	Y	Y
Wine	Y	Y	Y
White Spirit	Y	Y	Y
Xylene	Y	Y	Y