Table 5.6 Corrosion of Galvanized Steel in Contact with Organic Chemicals

Specimens of galvanized steel partially immersed in commercially pure test chemicals at ambient temperature for a minimum of 100 days; corrosion rate based on total area of specimen.

Corrosion media	Corrosion rate mils/year (1 mil/year = 25 μm/year)	Corrosion media	Corrosion rate mils/year (1 mil/year = 25 μm/year)
Acids		**Aldehydes**	
Acetic	[a]	Formaldehyde	<0.5
Propionic	[a]	Normal pentaldehyde	2.4
Butyric	[a]	Paraldehyde	2.5
Valeric	5.0	Propionaldehyde	[a]
2-Methylpentanoic	[a]	Valeraldehyde	1.5
2-Ethylbutyric	[a]	2-Ethylbutyraldehyde	[b]
2-Ethylhexoic	[a]	2-Ethylhexaldehyde	[b]
Isodecanoic	[a]	Methacrolein	<0.5
Di (2-ethylhexyl) phosphoric	[a]	Crotonaldehyde	1.5
Acrylics		Acrolein dimer	[c]
Acrylic acid	[a]	Glutaraldehyde-25% aq. soln.	3.5
Ethyl acrylate	<0.5	2-Hydroxyadipaldehyde-25% aq. soln.	1.0
Butyl acrylate	<0.5		
2-Ethylhexyl acrylate	<0.5	**Alkanolamines**	
Decyl acrylate	<0.5	Monoethanolamine	[a]
Glycidyl acrylate	<0.5	Diethanolamine	[a]
Alcohols		Monoisopropanolamine	[a]
Ethanol, 190 proof	1.0	Diisopropanolamine	<0.5
Isopropanol (19 vol %)	<0.5	Triisopropanolamine	<0.5
Isopropanol (anhyd)	<0.5	**Alkyl amines**	
Butanol	<0.5	Ethylamine–(69%)	0.5
2-Butanol	<0.5	Diethylamine	<0.5
Isobutanol	<0.5	Triethylamine	<0.5
1-Pentanol	<0.5	Propylamine	<0.5
2-Methyl-1 butanol (commercial)	<0.5	Dipropylamine	<0.5
3-Methyl-1 butanol	<0.5	Isopropylamine	<0.5
Primary amyl alcohol	<0.5	Diisopropylamine	<0.5
1-Hexanol	<0.5	Butylamine	<0.5
Isohexanol	<0.5	Dibutylamine	<0.5
Methyl amyl alcohol	<0.5	Amylamine	<0.5
2-Ethyl butanol	<0.5	Diamylamine	<0.5
2-Ethyl hexanol	<0.5	Hexylamine	<0.5
2,2,4-Trimethyl-1 pentanol	<0.5	2-Ethylhexylamine	<0.5
Isooctanol	<0.5	*N*-Methylbutylamine	<0.5
Diisobutyl carbinol	<0.5	*N*-Ethylbutylamine	<0.5

Table 5.6 Continued

Corrosion media	Corrosion rate mils/year (1 mil/year = 25 μm/year)	Corrosion media	Corrosion rate mils/year (1 mil/year = 25 μm/year)
Isodecanol	<0.5	**Esters**	
2,6,8-Trimethyl-4 nonanol	<0.5	Ethyl acetate	<0.5
Tridecanol	<0.5	Propyl acetate	<0.5
Alkylene amines		Isopropyl acetate	<0.5
Ethylenediamine (98%)	[a]	Butyl acetate	<0.5
Diethylenetriamine	<0.5	Isobutyl acetate	<0.5
Propylenediamine	1.5	Primary amyl acetate	<0.5
1,3-Diaminopropane	<0.5	Methyl amyl acetate	<0.5
Dimethylaminopropylamine	0.5	2-Ethylhexyl acetate	<0.5
Diethylaminopropylamine	0.5	Methylcellosolve acetate	[a]
Imino-bispropyamine	1.5	Cellosolve acetate	4.0
Tetramethyl–1,3-butanediamine	<0.5	Butylcellosolve acetate	0.5
N-Methyl-bis (aminopropyl)-		Carbitol acetate	<0.5
amine	0.5	Butylcarbitol acetate	<0.5
Aryls		Glycol diacetate	3.5
Phenol	<0.5	Diethyl sulfate	<0.5
Butylphenol	<0.5	Ethyl silicate (condensed)	0.5
Amylphenol	<0.5	Tetraethyl orthosilicate	<0.5
Nonylphenol	<0.5	Tetra (2-ethylhexyl) orthosilicate	<0.5
Dodecylphenol	<0.5	**Ethers**	
Ethylbenzene	<0.5	Dimethyl ether	<0.5
Styrene, monomeric	<0.5	Ethyl ether	<0.5
Acetophenone	<0.5	Isopropyl ether	<0.5
α-Methylbenzyl ether	<0.5	Butyl ether	<0.5
Phenyl methyl carbinol	<0.5	1,4-Dioxane	<0.5
Chlorine compounds		Glycol and triols	
Butyl chloride	<0.5	Diethylene glycol	<0.5
2-Butyl chloride	<0.5	Triethylene glycol	<0.5
2-Ethylhexyl chloride	<0.5	Tetraethylene glycol	<0.5
Ethylene dichloride	<0.5	1,3-Propanediol	<0.5
Propylene dichloride	<0.5	Propylene glycol	<0.5
1,1,2-Trichloroethane	<0.5	Dipropylene glycol	<0.5
1,2,3-Trichloropropane	<0.5	Hexylene glycol	<0.5
Dichloroethyl ether	<0.5		
Dichloroisopropyl ether	<0.5		
Triglycol dichloride	<0.5		
Ethylene chlorhydrin	<0.5		
Epichlorhydrin	<0.5		

Table 5.6 Continued

Corrosion media	Corrosion rate mils/year (1 mil/year = 25 μm/year)
Glycol ethers	
Methylcellosolve	<0.5
Cellosolve solvent	<0.5
Butylcellosolve	<0.5
Isobutylcellosolve	<0.5
Dibutylcellosolve	<0.5
Hexylcellosolve	<0.5
Methylcarbitol	<0.5
Carbitol solvent	<0.5
Butylcarbitol	<0.5
Butoxytriglycol	<0.5
Methoxytriglycol	<0.5
Ethoxytriglycol	<0.5
Ketones	
Acetone	<0.5
Methyl ethyl ketone	<0.5
Methyl propyl ketone	<0.5
Methyl isobutyl ketone	<0.5
Methyl *n*-amyl ketone	<0.5
Methyl isoamyl ketone	<0.5
Ethyl butyl ketone	<0.5
Diisobutyl ketone	<0.5
Mesityl oxide	<0.5
Isophorone	<0.5
Diacetone alcohol	<0.5
Latices	
Acrylic latex	[a]
Styrene–butadiene latex	[a]
Polyvinyl acetate latex	[a]
Vinyl acetate–acrylic copolymer latex	[a]
Monomers	
Acrylonitrile	<0.5
Styrene, monomeric	<0.5
Vinyl acetate	<0.5
Morpholines	
Morpholine (tetrahydro-1, 4-oxazine)	<0.5
2,6-Dimethylmorpholine	0.5
N-Methylmorpholine	<0.5
N-Ethylmorpholine	<0.5[d]
Nitriles	
Acetonitrile	<0.5
Butyronitrile	<0.5
Acrylonitrile	<0.5
Ethylene cyanohydrin	[a]
Oxides	
Ethylene oxide	<0.5
Propylene oxide	<0.5
Butylene oxide	<0.5
Styrene oxide	<0.5
Plasticizers	
Dibutyl phthalate	<0.5
Dioctyl phthalate	<0.5
Polyethylene glycols	
Polyethoxyethylene glycols	<0.5
Polymethoxyethylene glycols	<0.5
Polypropylene glycols	<0.5
Pyridine and piperazines	
α-Picoline	<0.5[d]
γ-Picoline	<0.5[d]
2-Methyl-5-ethylpyridine	<0.5[d]
N-Hydroxyethylpiperazine	0.5[e]
N-Aminoethylpiperazine	<0.5
Vinyl ethers	
Vinyl ethyl ether	<0.5
Vinyl butyl ether	<0.5
Vinyl isobutyl ether	<0.5
Vinyl 2-chlorethyl ether	<0.5

[a]Coating completely destroyed.
[b]Zinc coating partly removed.
[c]Incomparable—causes polymerization
[d]Product contaminated.
[e]Partially dissolved.
Source: Union Carbide, Chemicals Division.

Table 5.7 Corrosion Data for Zinc and Zinc Coatings with Organic Chemicals

Some references that occur frequently (and are mainly tabular summaries) are referred to in this table by letter code:

A = Helwig and Bird (1973)
B = Ritter (1958)
C = Ried (1964)
D = Dechema (1953)
E = Bauer and Schikorr (1934)
G = Wiederholt (1976)
I = International Nickel Co. (direct data)
J = Fuller (1927)
N = New Jersey Zinc Co. (direct data)
R = Clarke and Longhurst (1961)

Corrosive medium	Time (days, except as otherwise indicated)	Temperature (°C)	Corrosion rates g/m^2/year	Corrosion rates μm/year	General suitability[a]	Remarks	Ref.
Abietic acid					d	In conifers	D
Acetates							
Molten Li-Na-K		197–247			d		Marassi (1969)
Acetic acid							
0.1 g/L vapor	8	30	2,520	350	d		I
0.005 ppm vapor	21	30	33	5	b	100% RH over water	R
0.05 ppm vapor	21	30	78	11	b	100% RH over water	R
0.5 ppm vapor	21	30	945	132	d	100% RH over water	R
2.0 ppm vapor	21	30	4,300	600	d	100% RH over water	R
3.5 ppm vapor	21	30	5,250	735	d	100% RH over water	R
5.0 ppm vapor	21	30	7,050	990	d	100% RH over water	R
20.0 ppm vapor	21	30	2,015	282	d	100% RH over water	R
35.0 ppm vapor	21	30	1,305	183	d	100% RH over water	R
50.0 ppm vapor	21	30	1,415	198	d	100% RH over water	R
500.0 ppm vapor	21	30	3,125	440	d	100% RH over water	R
1% in water vapor	6	30	7,960	1,115	d	72% RH	R
0.5% in saturated Na acetate vapor	42	30	200	28	c	100% RH	R
pH 3.8 vapor	8	RT	290	40	c		Gilbert and Hadden (1950)

Table 5.7 Continued

Some references that occur frequently (and are mainly tabular summaries) are referred to in this table by letter code:

A = Helwig and Bird (1973)
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J = Fuller (1927)
N = New Jersey Zinc Co. (direct data)
R = Clarke and Longhurst (1961)

Corrosive medium	Time (days, except as otherwise indicated)	Temperature (°C)	Corrosion rates		General suitability[a]	Remarks	Ref.
			g/m²/year	µm/year			
Acetic acid (continued)							
2.1% vapor	30	RT	965	135	c	0.02 µg/dm² Cr in surface film	A
2.1% vapor	30	RT	485	68	c	1.3 µg/dm² Cr in surface film	A
2.1% vapor	30	RT	197	28	b	2.2 µg/dm² Cr in surface film	A
5.1% vapor	30	RT	370	52	c	0.02 µg/dm² Cr in surface film	A
5.1% vapor	30	RT	168	24	b	1.3 µg/dm² Cr in surface film	A
5.1% vapor	30	RT	44	6	b	2.2 µg/dm² Cr in surface film	A
6% immersed	2	30	111,300	15,600	d	Still	J
6% immersed			133,200	18,650	d	Aerated	J
Acetic acid esters							
20%		50			d		C, I
90%		20			b		C, I
Acetic aldehyde							
20%		50			d		C, I
Acetone							
As vapor	30	Hot	0	0	a	Galvanized steel containers	I
Immersed	180	RT	0.1	<0.02	a		I
+ 5% water	7	30	4	0.6	a		Schlapfer and Bukowiecki (1948)
+ formic acid	7	30	4	0.6	a		Schlapfer and Bukowiecki (1948)

Acetylene						
60%	20			b		C
Pure dry				a	Transported in galvanized containers	B, D, E, F, Tödt (1961)
Moist				c		
Acrylic acid				d	Attack more than with proprionic acid	
Alcohols						
Pure dry				a		B
50% solution				c		B
Aldehydes						
Aromatic				d		B
Algae					Are destroyed	Minnesota Mining & Manufacturing Co.
Alkyd resins				a	Paint vehicle	D, G
Alkyl silicates				a	In zinc silicate paints	MacLeod (1966), Bullett (1969)
Allyl chloride				d		D
Amides				b	Often an inhibitor	Liddell (1961)
Amines				b	Often an inhibitor	
Amino acids				b		Grigorev and Kuznetsov (1969)
Amyl alcohol						
Pure dry				a	Stored in galvanized containers	D
Aniline	20			a	Inhibitor in H_2SO_4	D
Aniline sulfate				d		D
Aniline sulfide				d		D
Anthracene				a	If acid-free	D
Ascorbic acid				d		D
Bacteria					Influence corrosion mechanism (soils)	Ehlert (1970) Guillaume (1970) MacDougall (1969)
Beeswax				c		D
Benzaldehyde						
Solution	40	15–250	2–35	a–b		D, E
100%	80			d		B, C
Benzidine				a		D
Benzine/benzol				a–d	Depending on S content	D, Radtke (1969)
Benzoic acid						

Table 5.7 Continued

Some references that occur frequently (and are mainly tabular summaries) are referred to in this table by letter code:

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G	=	Wiederholt (1976)
I	=	International Nickel Co. (direct data)
J	=	Fuller (1927)
N	=	New Jersey Zinc Co. (direct data)
R	=	Clarke and Longhurst (1961)

Corrosive medium	Time (days, except as otherwise indicated)	Temperature (°C)	Corrosion rates g/m²/year	Corrosion rates µm/year	General suitability[a]	Remarks	Ref.
Vapor					d		Gmelin (1956)
100%		60			d		C, D
Binders					b		G (many)
Butane					a		
Butyl alcohol							
100%		80			b	Can use galvanized drums	C, D
Caprylic alcohol							
Pure, neutral					b	Sent in galvanized drums	D
Carbon tetrachloride							
Dry		20	13,870	1,940	c	Only for short contact: other hydrocarbons better	Bukowiecki (1968), B, D
(C_2HCl_3 or C_2Cl_4)			510	71	b		Bukawiecki (1968), B, D
Castor oil					b	Binder	Van Eijnsbergen (1967)
Cellulose acetyl							
Neutral, moist					b	Stored in galvanized drums	D
Cellulose nitrate					b	Sent in galvanized drums	D
Chlorinated phenols							
Pure, dry		20			a	Sent in galvanized drums	D
Moist					d		Dirkse (1970)

Chloroform									
Pure, dry, neutral				20			a	Sent in galvanized drums	D, E
Citrates							d		
Citric acid									
2%		21		RT			d	Specimen dissolved	I
<0.64% air-free							b	3–5 times more than tartaric acid	B, D, G
<0.64% aerated							d		
Cork									
Pure, dry							a		F
***m*-Cresol**									
Pure, dry		100		25	5	0.7	a		I
Pure, dry − vapor		100		Hot	High	High	d		I
Pure + 10% water		100		25	9	1.3	a		I
Pure + 10% water − vapor		100		Hot	10,300	1,440	d		I
***o*-Cresol**									
Pure, dry		100		25	9	1.3	a		I
Pure − vapor		100		Hot	9,900	1,390	d		I
Pure + 10% water		100		25	3	0.4	a		I
Pure + 10% water − vapor		100		Hot	2,050	287	d		I
Cyclohexanol							a		D
Dextrin							a		D
Diphenyl							a		D
Ethane							a		D
Ethanol								Higher than methanol	Lechner-Knoblauch and Heitz (1987)
200 proof	Also down to 25 v/o in DW	13	months	RT	0	0	a		N
190 proof	45 v/o in tap water	8	months	RT	39	5	a		N
190 proof	45 v/o in tap water; 8 h hot, 16 h cold daily	5		bp	8	1.1	a		
190 proof: vapor		5		bp	160	22	b		N
190 proof	40 v/o +	8	months	RT	141	20	b		N
190 proof	5 v/o methanol in tap water	5		bp	378	53	c		N

Table 5.7 Continued

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G = Wiederholt (1976)
I = International Nickel Co. (direct data)
J = Fuller (1927)
N = New Jersey Zinc Co. (direct data)
R = Clarke and Longhurst (1961)

Corrosive medium		Time (days, except as otherwise indicated)	Temperature (°C)	Corrosion rates g/m²/year	Corrosion rates µm/year	General suitability[a]	Remarks	Ref.
190 proof	+ formic acid (e.g., to 0.1 mg KOH/g)	7	30	120	17	b		Schlapfer and Bukowiecki (1948)
190 proof	+ 5% water	7	30	0	0	a		Schlapfer and Bukowiecki (1948)
Ethanolamine						d		D
Ether								
Pure			20			c		B, G
Ethyl acetate								
+ 5% water		7	30	1,350	189	d		Schlapfer and Bukowiecki (1948)
+ formic acid (e.g., to 0.1 mg KOH/g)		7	30	18	2.5	a		Schlapfer and Bukowiecki (1948)
Ethyl chloride								
100%			20			d		C, D, E
Ethyl mercaptan							For example, in crude oils: with water, corrosion increases	D
Ethylene						a		D

Ethylene glycol							
50% solution	14	24	120	17	b		
50% solution	14	−7	59	8	a		
50% solution	14	−23	15	2	a		
50% solution	14	77	1,354	190	d		
50% + 1% borax	14	24	243	34	c		
50% solution + 1% borax	14	−7	610	85	c		
50% solution + 1% borax	14	−23	288	40	c		
50% solution + 1% borax	14	77	0	0	a		
50% solution + 1% $NaNO_2$	14	−7	31	4	a		
50% solution + 1% $NaCO_3$	14	−7	9	1.3	a		
50% solution + 1% acetate	14	−7	106	15	b		
50% solution + 1% sodium benzoate	14	−7	148	21	b		
Fatty acids							
C_6 upward: 100%		75			d		C
Formaldehyde							
Pure, dry		20			b		D, E
Moist					d		B, D, E, G
0.1 g/L vapor 90% RH	8	30	183	25	c		I
Formic acid							
2.5% vapor	30	RT	840	118	c	With chromate film	A
			250	35	c	containing 0.02, 1.3, and	
			160	22	b	2.2 μg/dm², respectively	
4.6% solution	4 h	100	219,000	30,670	d		A
0.1 g/L vapor: 90% RH	8	30	30,660	4,300	d		I
pH 3.8 vapor: 100% RH	8	RT	77	11	b		Gilbert and Hadden (1950)
Gasoline							
Untreated	180	RT	31	4	a		N
+ 40 ppm lecithin	180	RT	5	0.7	a		N
+ 40 ppm + 10% water	180	RT	137	19	c	Corroded in water layer	N
+ 10% water	180	RT	246	35	c	Pitted in water layer	N
Glues							
12.5% pH 5.6	69	50	3,030	425	c–d	Inhibitor in H_2SO_4	D, G, I
Glutaminic acid					d		D
Glycerine							
Pure, dry, neutral	240	RT	0	0	a		D

Table 5.7 Continued

Some references that occur frequently (and are mainly tabular summaries) are referred to in this table by letter code:

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E = Bauer and Schikorr (1934)
G = Wiederholt (1976)
I = International Nickel Co. (direct data)
J = Fuller (1927)
N = New Jersey Zinc Co. (direct data)
R = Clarke and Longhurst (1961)

Corrosive medium	Time (days, except as otherwise indicated)	Temperature (°C)	Corrosion rates		General suitability[a]	Remarks	Ref.
			g/m^2/year	μm/year			
Glycol							
10% solution		40			d	Fire extinguisher use	C
50% solution		−6	58	8	b		D
50% solution + 1% borax	Hot	−6	610	85	c		D
Glycolic acid							
7.6% solution	4 h	100	1,314,000	184,000	d		I
37% solution		20			d		D, Gmelin (1956)
Glycol diacetate			610	85	b		
Hydrazine							
Water-free					b		B, D, E
Impregnating oils							
Water-free, neutral					b	Stored in galvanized containers	D
Moist					d		D
Isobutanol							
+ formic acid (e.g., to 0.1 mg KOH/g)	7	30	15	2	a		Schlapfer and Bukowiecki (1948)
+ 5% water	7	30	0	0	a		Schlapfer and Bukowiecki (1948)

Jute							
Unrotted					b		D
Rotted					d		D
Kerosene					a		Gmelin (1956)
Ketones							
Pure, neutral					a		
Lactic acid							
10%		40			d	More attack than butyric acid	C, Gmelin (1956)
Maleic acid							
100%		40			d		C, D
Mercaptans							
Dissolved in naphtha					b		D
Water solution					d	Two-liquid phase	D
Methane							
100%		80			a		C, D
Methanol (commercial)						Lower than ethanol	Lechner-Knoblauch and Heitz
Immersed	180	RT	0	0	a		(1987), Teeple (1952)
Vapor	30	bp	0	0	a		
Methanol 100%							
Immersed	240	RT	29	4	a		N
Methanol 35% in tap water							
Immersed	240	RT	101	14	b		N
Vapor	5	bp	39	5	a		N
Methanol 30% in tap water							
Immersed	30	bp	355	50	b	AC-41A die casting	N
Immersed	365	RT	296	41	b	AC-41A die casting	N
Methanol 100%							
Immersed		60–70				Transported in galvanized containers	D
Methanol, impure							
Moist					d	Dissociates	D
Methyl acetate							
Pure, dry, neutral					a		D
Moist					d		D
Methyl bromide							
Pure, 0.08% H_2O					a	Transported in galvanized containers	D
Moist					d		D

Table 5.7 Continued

Some references that occur frequently (and are mainly tabular summaries) are referred to in this table by letter code:

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G = Wiederholt (1976)
I = International Nickel Co. (direct data)
J = Fuller (1927)
N = New Jersey Zinc Co. (direct data)
R = Clarke and Longhurst (1961)

Corrosive medium	Time (days, except as otherwise indicated)	Temperature (°C)	Corrosion rates		General suitability[a]	Remarks	Ref.
			g/m^2/year	µm/year			
Methyl chloride							
Dry, pure					d	But if water-free can be transported in galvanized containers	D
Methyl ethyl ketone							
+ 0.03% acetic and 0.2% water	128	10	190	27	b	Some agitation	I
+ trace acetic and 0.1% water	30	10	37	5	a		I
+ trace acetic + heptane	142	24	22	3	a	Moderate agitation	I
Methylamine					d		D
Milk							
pH 4.03		20	9,930	1,380	d	Unsuitable because of effect	Gmelin (1956)
		97	9,200	1,280	d	on the milk anyhow	Gmelin (1956)
pH 6.6		20	22	3	a		Gmelin (1956)
		75	11	1.5	a		Gmelin (1956)
Naphtha							
Immersed	50	155	1,124	157	d		I
Vapor			347	49	c		I
Nitrobenzine					d		B, C, D
Nitrotoluene					b		D

Oil							
No. 6 fuel	267	RT	14	2	a		I
Crude, light: immersed	55	RT	9	1.3	a		I
Crude, light: vapor	55	RT	11	1.5	a		I
Neutral, light: immersed	55	RT	1,836	257	c		I
Neutral, light: vapor	55	RT	54	8	a		I
Oxalates							
With phosphates						Indicative of protective layer	G
Oxalic acid							
0.01–0.01% solution		20			c		C, D, F, Huber (1968)
10% solution			24,090	3,375	d		D
Paraffin							
Pure, dry					a		
Perchlorethylene							
Vapor	64	127	4,300	600	c		I
Immersion	64	151	14,874	2,080	d		I
Phehol							
Pure, dry	100	25	5	0.7	a		
Pure, dry: vapor	100	bp	High	High	d		
+ 10% H_2O	100	25	6	0.8	a		Rhodes et al. (1934)
+ 10% H_2O vapor	100	bp	544	76	c		
0.1 g/L 90% RH vapor	8	30	46	6	b		
Phenol formaldehyde							
Resins					a		Kloetz (1963), Grauer (1966)
Phenol–formalin–water mixture	184	27	620	87	c		Rhodes et al (1934)
Phenolsulfuric acid					b		
Phosgene							
Pure, dry		20			a		B, D, F
Moist					d		B
***n*-Propanol**							
+ 5% H_2O	7	30	11	1.5	a		Schlapfer and Bukowiecki (1948)
+ formic acid (equivalent to 0.1 mg KOH/g)	7	30	11	1.5	a		Schlapfer and Bukowiecki (1948)
Rape oil		100			c		Gmelin (1956)
Shellac					b		

Table 5.7 Continued

Some references that occur frequently (and are mainly tabular summaries) are referred to in this table by letter code:

A = Helwig and Bird (1973)
B = Ritter (1958)
C = Ried (1964)
D = Dechema (1953)
E = Bauer and Schikorr (1934)
G = Wiederholt (1976)
I = International Nickel Co. (direct data)
J = Fuller (1927)
N = New Jersey Zinc Co. (direct data)
R = Clarke and Longhurst (1961)

Corrosive medium	Time (days, except as otherwise indicated)	Temperature (°C)	Corrosion rates g/m²/year	Corrosion rates µm/year	General suitability[a]	Remarks	Ref.
Soya oil					b		White and Deanin (1965)
Tannic acid							
50% solution			20	2.8	d		G
Tartaric acid							
10% solution		60	36,135	5,060	d		G, Gmelin (1956)
Thiourea					b		G
Trichloracetic acid							
+ nitrobenzene					d	Very strong attack	F, Gmelin (1956)
Trichlorethylene							
Immersed	41 h		10,549	1,480	d	In storage tank	I
Vapor	41 h	45	380	53	b	In dryer	I
Vapor	41 h	84	496	69	b	In exhaust duct	I
Vapor			13,760	1,925	d	In still	I
With water					b	Attack in water layer	N
Turpentine					b		
Urethanes					a	Paint vehicles	Van Oeteren (1967)
Vinyl acrylic resins					a	Zinc dust paint vehicles	Laberenz (1970)
Waxes					a		G

[a]Ratings: a = little attack (<10 µm/year), very useful; b = attack (10–100 µm/year), but may be useful; c = heavier attack (100–3000 µm/year), not usually suitable; d = rapid attack, unsuitable for use.