Zirconium Products

ZIRCADYNE® ZIRCONIUM CORROSION DATA

CORROSIVE MEDIA	CONCENTRATION %	TEMPERATURE °C	CORROSION RATE, mpy			REMARKS
			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Acetaldehyde	100	Boiling	<2	—	—	
Acetic Acid	5-99.5	35-Boiling	<1	—	<1	
Acetic Acid (anhydride)	99	Room-Boiling	<1	—	<1	
Acetic Acid (glacial)	99.7	Boiling	<5	—	—	
Acetic Acid	100	200	<1	—	<1	
Acetic Acid +1% Acetyl Chloride	99	Boiling	>50	—	—	
Acetic Acid (glacial) + 0.5% CH_3OH	99	200	<1	—	—	
Acetic Acid (glacial) + 200 ppm $FeCl_3$	99	200	<1	—	—	
Acetic Acid (glacial) + 0.5% CH_3OH + 200 ppm $FeCl_3$ + 1% H_2O	98	200	<1	—	—	
Acetic Acid + 50 ppm I^-(KI)	100	160, 200	<1	—	—	
Acetic Acid + 1% I^-(KI) + 100 ppm $Fe^{+3}(Fe_2(SO_4)_3)$	99	200	<1	—	<1	
Acetic Acid + 2% HI	80	100	<1	—	<1	
Acetic Acid + 2% HI, 1000 ppm Fe (Fe powder)	80	100	<1	—	—	
Acetic Acid + 2% HI, 1% methanol, 500 ppm formic, 100 ppm Cu	80	150	<1	—	<1	
Acetic Acid + 2% HI, 1% methanol, 500 ppm formic, 100 ppm Fe	80	150	<1	—	<1	
Acetic Acid + 2% HI	98	150	<1	—	<1	

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			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Acetic Acid + 2% HI + 200 ppm $Fe^{+3}(FeCl_3)$	80	100	<1	—	<1	
Acetic Acid + 2% HI + 200 ppm $Fe^{+3}(Fe_2(SO_4)_3)$	80	100	<1	—	<1	
Acetic Acid + 2% I^- (KI)	98	150	<1	—	<1	
Acetic Acid + 2% HI + 1% CH_3OH + 500 ppm HCOOH	80	150	<1	—	<1	
Acetic Acid + 2% HI + 200 ppm Cl^- (NaCl)	80	100	<1	—	<1	
Acetic Acid + 50% Acetic Anhydride	50	Boiling	<1	—	<1	
Acetic Acid + 50% 48% HBr	50	115	<1	—	<1	
Acetic Acid + Saturated gaseous HCl and Cl_2	100	Boiling	>200	—	>200	
Acetic Acid + Saturated gaseous HCl and Cl_2	100	40	<1	—	—	
Acetic Acid + 0.5% CH_3OH + 200 ppm $FeCl_3$ + 5% H_2O	94	200	<1	—	—	
Acetic Acid + 10% CH_3OH	90	200	<1	—	—	
Acetic Acid + 10% CH_3OH + 200 ppm $FeCl_3$ + 5% H_2O	84	200	<1	—	—	
Acetic Acid + 10% CH_3OH + 200 ppm $FeCl_3$ + 1% H_2O	88	200	<1	—	—	
Acetyl Chloride	100	25	>200	—	—	
Aluminum Chlorate	30	100	<2	—	—	
Aluminum Chloride	5, 10, 25 25 40	35-100 Boiling 100	<1 <1 <2	— — —	— <1 —	
Aluminum Chloride (aerated)	5, 10	60	<2	—	—	
Aluminum Chloride	25-50	Boiling	<1	—	<1	

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			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Aluminum Chloride + Saturated 1% HCl	—	R.T.	<1	—	—	
Aluminum Chloride + Saturated 1% HCl	—	110	10-20	—	—	
Aluminum Fluoride	20	Room	>50	—	—	pH = 3.2
Aluminum Fluoride + 0.5% HF + 16% Zr sponge	7.2	90	<1	—	—	
Aluminum Potassium Sulfate	10	Boiling	nil	—	nil	pH = 3.2
Aluminum Sulfate	25 60	Boiling 100	nil <2	— —	nil —	
Ammonia (wet)	+ water	38	<5	—	—	
Ammonium Carbamate	—	193	<1	—	—	58.4% Urea, 16.8% Ammonia, 14.8% CO_2, 9.9% H_2O at 3,200-3,500 psi
Ammonium Chloride	1,10, saturated	35-100	<1	—	—	
Ammonium Hydrogen Phosphate	22.8	204	nil	—	—	
Ammonium Hydroxide	28	Room-100	<1	—	—	
Ammonium Fluoride	20 20	28 98	>50 >50	— —	— —	pH = 8 pH = 8
Ammonium Oxalate	100	100	<2	—	—	
Ammonium Sulfate	10	Boiling	nil	—	—	
Aniline Hydrochloride	5, 20 5, 20	35-100 100	<1 <2	— —	— —	
Aqua Regia	3:1	Room	>50	—	—	3 parts HCl/1 part HNO_3
Barium Chloride	5, 20 25	35-100 Boiling	<1 5-10	— —	— —	
Bromine	100-Liquid Vapor	20 20	<10 —	— —	20-50 >50	Pitting Pitting
Bromochloromethane	100	100	<2	—	—	
Cadmium Chloride	100	Room	<2	—	—	

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			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Calcium Bromide	100	100	< 2	—	—	
Calcium Chloride	5, 10, 25 70 75 Mixture	35-100 Boiling Boiling 79	< 1 < 1 < 5 < 1	— — — —	— < 1 — —	 B.P. = 162°C 14% $CaCl_2$, 8% NaCl 0.2% $Ca(OH)_2$
Calcium Chloride + 0.1% $MgCl_2$	0.2	80	< 1	—	—	pH = 1
Calcium Chloride + 0.1% $MgCl_2$ + 300 ppm F^- (as CaF_2)	0.2	80	> 50	—	—	pH = 1
Calcium Chloride + 0.1% $MgCl_2$ + 300 ppm F^- (as CaF_2) + 1200 ppm P_2O_5	0.2	80	5-20	—	—	pH = 1
Calcium Chloride + 1% $MgCl_2$	2	80	< 1	—	—	pH = 1
Calcium Chloride + 1% $MgCl_2$ + 300 ppm F^- (as CaF_2)	2	80	> 50	—	—	pH = 1
Calcium Chloride + 1% $MgCl_2$ + 300 ppm F^- (as CaF_2) + 1200 ppm P_2O_5	2	80	< 1	—	—	pH = 1
Calcium Chloride + 3.3% $MgCl_2$	6.6	80	< 1	—	—	pH = 1
Calcium Chloride + 3.3% $MgCl_2$ + 300 ppm F^- (as CaF_2)	6.6	80	20-50	—	—	pH = 1
Calcium Chloride + 3.3% $MgCl_2$ + 300 ppm F^- (as CaF_2) + 1200 ppm P_2O_5	6.6	80	< 1	—	—	pH = 1
Calcium Fluoride	Saturated Saturated	28 90	nil nil	— —	— —	pH = 5 pH = 5
Calcium Hypochlorite	2, 6, 20	100	< 5	—	—	
Carbonic Acid	Saturated	100	< 5	—	—	
Carbon Tetrachloride	0-100	Room-100	< 2	—	—	
Chlorine (water saturated)	—	Room 75	> 50 > 50	— —	— —	

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			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Chlorine Gas (more than 0.13% H_2O)	100	94	> 50	—	—	
Chlorine Gas (dry)	100	Room	< 5	—	—	
Chlorinated Water	—	100	< 2	—	—	
Chloroacetic Acid	100	Boiling	< 1	—	—	
Chlorosulfonic Acid	100	R.T.	5-10	—	—	
Chlorosulfonic Acid	100	0	< 2	—	—	
Chromic Acid	10-50	Boiling	< 1	—	—	
Citric Acid	10-50 10, 25, 50 50	35-100 100 Boiling	< 1 < 1 < 5	— — —	— — —	
Chrome Plating Solution	—	66	> 50	—	> 50	M + T Chemicals CR-100
Cupric Chloride	5, 10, 20 20, 40, 50	35-100 Boiling	> 50 > 50	> 50 > 50	> 50 > 50	
Cupric Cyanide	Saturated	Room	> 50	—	—	
Cupric Nitrate	40	Boiling	W.G.	—	W.G.	B.P. = 115°C
Dichloroacetic Acid	100	Boiling	< 20	—	—	
Ethylene Dichloride	100	Boiling	< 5	—	—	
Ferric Chloride	0-50 0-50	Room-100 Boiling	> 50 > 50	> 50 > 50	> 50 > 50	
Ferric Sulfate	10	0-100	< 2	—	—	
Formaldehyde	6-37 0-70	Boiling Room-100	< 1 < 2	— —	< 1 —	
Fluoboric Acid	5-20	Elevated	> 50	—	—	
Fluosilicic Acid	10	Room	> 50	—	—	
Formic Acid	10-90	35-Boiling	< 1	—	—	
Formic Acid (aerated)	10-90	Room-100	< 1	—	—	
Formic Acid	50	Boiling	< 1	—	< 1	
Formic Acid	70, 98	Boiling	< 1	—	—	

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			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Formic Acid + 5% H_2SO_4	50, 70, 93	Boiling	< 1	—	—	
Formic Acid + 5% HCl	50, 70, 85	Boiling	< 1	—	—	
Formic Acid + 1% Fe Powder	50, 70, 98	Boiling	< 1	—	—	
Formic Acid + 1% Cu^{+2}	50, 70, 96	Boiling	< 1	—	—	
Formic Acid + 5% HI	50, 70, 90	Boiling	< 1	—	—	
Hydrazine	50	200	nil	—	nil	
Hydrazine	Mixture	109	< 1	—	—	2% Hydrazine + saturated NaCl + 6% NaOH
	Mixture	130	nil	—	—	2% Hydrazine + saturated NaCl + 6% NaOH
Hydriodic Acid	47	120	< 1	—	< 1	
Hydrobromic Acid	48	Boiling	< 5	—	< 5	B.P. = 125°C (shallow pits)
	Mixture	Boiling	< 1	—	< 1	24% HBr + 50% Acetic Acid (glacial)
Hydrochloric Acid	2	100	< 1	—	—	
		225	< 1	—	< 1	
	10	30	< 1	—	—	
		100	< 1	—	—	
	20	30	< 1	—	—	
		100	< 1	—	—	
		150	< 2	—	—	
	32	30	< 1	—	—	
		77	< 1	—	—	Weld sensitization
	37	30	< 1	—	—	Weld sensitization
		51	< 2	—	—	Weld sensitization
Hydrochloric Acid + Cl_2 gas	20	58	5-10	—	—	Pitting
Hydrochloric Acid + Cl_2 gas	37	58	< 5	—	—	
Hydrochloric Acid + 100 ppm $FeCl_3$	10	30	< 1	< 2	< 1	SCC observed
Hydrochloric Acid + 100	10	105	< 5	—	—	Pitting Rate
Hydrocholoric Acid + 100 ppm $FeCl_3$	20	105	< 5	—	—	

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			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Hydrocholoric Acid + 100 ppm $FeCl_3$	34	53	5-10	—	—	SCC Observed
Hydrochloric Acid + 50 ppm Fe^{+3}	10	30	< 1	—	—	
		60	< 1	—	—	
		100	< 1	—	—	Pitting
	20	30	< 1	—	—	
		60	< 1	—	—	
		100	< 1	—	—	Pitting
	32	30	< 1	—	—	
		77	< 2	—	—	Weld sensitization
	37	30	< 2	—	—	Weld sensitization
		51	< 5	—	—	Weld sensitization
Hydrochloric Acid + 100 ppm Fe^{+3}	10	30	< 1	—	—	
		60	< 1	—	—	
		100	< 1	—	—	Pitting
	20	30	< 1	—	—	
		60	< 1	—	—	Pitting
		100	< 1	—	—	
	32	30	< 1	—	—	
		77	< 2	—	—	Weld sensitization
	37	30	< 2	—	—	Weld sensitization
		51	< 5	—	—	Weld sensitization
Hydrochloric Acid + 500 ppm Fe^{+3}	10	30	< 1	—	—	Pitting, SCC
		60	< 1	—	—	Pitting, SCC
		100	< 1	—	—	Pitting, SCC
	20	30	< 1	—	—	Pitting, SCC
		60	< 1	—	—	Pitting, SCC
		100	< 1	—	—	Pitting, SCC
	32	30	< 1	—	—	SCC
		77	< 5	—	—	Weld sensitization, SCC
	37	30	< 2	—	—	Weld sensitization, SCC
		51	< 5	—	—	Weld sensitization, SCC
Hydrochloric Acid + 200 ppm HF	10	100	> 50	—	—	
Hydrochloric Acid + 200 ppm HF + 800 ppm Zr sponge	10	100	< 1	—	—	
Hydrochloric Acid	Mixture	Room	Dissolved	—	—	20% HCl + 20% HNO_3
	Mixture	Room	Dissolved	—	—	10% HCl + 10% HNO_3
Hydrofluoric Acid	All	Room	> 50	—	—	
Hydrogen Peroxide	30	Boiling	nil	—	nil	
Hydrogen Peroxide	50	100	< 2	—	—	

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			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Hydroxyacetic Acid	70	205	< 1	—	< 1	
Iodine Vapor	—	100, 180	< 1	—	—	
Iodine Liquid	100	120	5-20	—	—	
Iodine Liquid	100	180	> 50	—	—	
Lactic Acid	10-100 10-85	148 35-Boiling	< 1 < 1	— —	— —	
Lithium Chloride	Saturated	30-80	5-10	—	—	
Lithium Chloride	Saturated	80	nil	—	—	pH adjusted to 6.0 with NaOH
Magnesium Chloride	5-40 47	Room-100 Boiling	< 2 nil	— —	— nil	
Magnesium Chloride	30	Boiling	< 2	—	< 2	
Magnesium Chloride + 1% HCl	30	Boiling	< 2	—	< 2	
Magnesium Chloride + 5% HCl	30	Boiling	< 2	—	< 2	
Magnesium Chloride + 10% HCl	30	Boiling	< 2	—	< 2	
Manganese Chloride	5, 20	Room-100	< 1	—	—	
Mercuric Chloride	1-Saturated Saturated	35-100 Boiling	< 1 < 1	— —	— < 1	
Methanol	100	Boiling 200	nil	—	nil	
Methanol + 0.1% KI + 0.1% HCOOH	99.8	65	nil	—	nil	
Methanol + 1% KI	99	200	< 1	—	< 1	500 ppm Fe^{+3}
Nickel Chloride	5, 20 5-20 30	35-100 100 Boiling	< 1 < 1 nil	— — —	— — nil	
Nitric Acid	20 70 10-70 70-98	103 121 Room-260 Room-Boiling	< 1 < 1 < 1 < 1*	< 1 < 1 — —	< 1 < 1 — —	*SCC Observed

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Nitric Acid	80	120, 150	< 1	—	—	
Nitric Acid	90	120, 150	< 1	—	—	
Nitric Acid + Saturated Cl_2	30, 50, 70	Boiling	< 1	—	—	Pitting may be observed in the vapor phase
Nitric Acid + 200 ppm HF	90	25	> 50	—	—	
Nitric Acid + 200 ppm HF + 800 ppm Zr sponge	90	25	< 1	—	—	
Nitric Acid + 1% Fe	65	120, 204	< 1	—	—	
Nitric Acid + 1.45% 304 S.S.	65	120, 204	nil	—	—	
Nitric Acid + 1% Cl^- (as NaCl)	30, 50, 70	120	nil	—	—	
Nitric Acid + 1% Seawater	70	120	nil	—	—	
Nitric Acid + 1% $FeCl_3$	70	120	nil	—	—	
Oxalic Acid	0-100	100	< 1	—	—	
Perchloric Acid	70	100	< 2	—	—	
Phenol	Saturated	Room	< 5	—	—	
Phosphoric Acid	5-30	Room	< 5	—	—	
	5-35	60	< 5	—	—	
	5-50	100	< 5	—	—	
	35-50	Room	< 5	—	—	
	45	Boiling	< 5	—	—	
	50	Boiling	< 5	5-10	10-15	B.P. = 108° C
	65	100	5-10	—	< 20	
	70	Boiling	> 50	—	> 50	B.P. = 123-126° C
	85	38	5-20	—	—	
	85	80	20-50	—	20-50	
	85	Boiling	> 50	—	> 50	B.P. = 156° C
	Mixture	Room	nil	—	—	88% H_3PO_4 + 0.5% HNO_3
	Mixture	Room	W.G.	—	—	88% H_3PO_4 + 5% HNO_3
	Mixture	89	> 50	—	> 50	85% H_3PO_4 + 4% HNO_3
Phosphoric Acid	20	150	< 1	—	—	
Phosphoric Acid + 4.3% Ammonia	18	204	nil	—	—	
Phosphoric Acid + 2 ppm F^{-1}	30-50	Boiling	20-50	—	—	

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Phosphoric Acid + 4.3% NH_3	18.5	204	< 1	—	—	
Potassium Chloride	Saturated Saturated	60 Room	< 1 < 1	— —	— —	
Potassium Fluoride	20 20 0.3	28 90 Boiling	nil > 50 < 1	— — —	— — —	pH = 8.9 pH = 8.9
Potassium Hydroxide	50 10 25 50 50-anhydrous Mixture	27 Boiling Boiling Boiling 241-377 29	< 1 < 1 < 1 < 1 > 50 < 1	— — — — — —	— — — — — —	13% KOH, 13% KCl
Potassium Iodide	0-70	Room-100	< 2	—	< 2	
Potassium Nitrite	0-100	Room-100	< 2	—	—	
Silver Nitrate	50	Room	< 5	—	—	
Sodium Bisulfate	40	Boiling	< 1	—	< 1	B.P. = 107°C
Sodium Carbonate	10	R.T.-Boiling	< 1	—	< 1	
Sodium Chlorate	20	Boiling	nil	—	—	
Sodium Chloride	3-Saturated 29 Saturated Saturated Saturated	35-Boiling Boiling Room Boiling 107	< 1 < 1 < 1 < 1 nil	— — — — —	< 1 — — < 1 —	Adjusted to pH = 1 Adjusted to pH = 0
Sodium Chloride + Saturated SO_2	3.5	80	nil	—	—	
Sodium Chloride + Saturated SO_2	25	80	nil	—	—	
Sodium Chloride + Saturated SO_2	Saturated	80	nil	—	—	
Sodium Chloride	Mixture	215	nil	nil	nil	25% NaCl + 0.5% Acetic Acid + 1% S + saturated H_2S
Sodium Chloride + 0.5% CH_3COOH + Saturated H_2S	25	R.T. - boiling	< 1	< 1	< 1	

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Sodium Chloride + 0.5% CH_3COOH + 0.1% S + saturated (H_2S + CO_2)	25	204, 232	< 1	—	—	
Sodium Chloride + 0.5% CH_3COOH + 0.1% S + Saturated H_2S	25	250	< 1	—	< 1	
Sodium Fluoride	Saturated Saturated	28 90	nil > 50	— —	— —	
Sodium Formate	0-80	100	< 2	—	—	
Sodium Hydrogen Sulfite	40	Boiling	< 1	—	< 1	
Sodium Hydroxide	5-10 28 10-25 40 50 50 50-73 70 73 73 to anhydrous Mixture Mixture Mixture Mixture Mixture	21 Room Boiling 100 38-57 149 188 150 110-129 212-538 82 10-32 129 191 138	< 1 < 1 < 1 < 1 < 1 < 2 20-50 < 5 < 2 20-50 < 1 < 1 < 1 < 1 < 5	— — — — — — — — — — — — — — —	— — — — — < 2 — — — — — — — — —	9-11% NaOH, 15% NaCl 10% NaOH, 10% NaCl & wet $CoCl_2$ 0.6% NaOH, 2% $NaClO_3$ + trace of NH_3 7% NaOH, 53% NaCl, 7% $NaClO_3$, 80-100 ppm NH_3 52% NaOH + 16% NH_3
Sodium Hydroxide (Suspended salt-violent boiling)	20	60	10-20	—	—	
Sodium Hydroxide + 750 ppm Free Cl_2	50 50	38 38-57	< 1 < 1	— —	— —	
Sodium Hypochlorite	6 6	100 50	< 5 nil	— —	— nil	as received super chlor.
Sodium Iodide	0-60	100	< 2	—	—	
Sodium Peroxide	0-100	Room-100	< 2	—	—	
Sodium Oxychloride + 15% Sodium Chloride + 5% Sodium Carbonate	15	46	0	0	< 1	
Sodium Silicate	0-100	Room-100	< 2	—	—	

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Sodium Sulfate	0-20	Room-100	< 2	—	—	
Sodium Sulfide	10 33	200 Boiling	nil nil	— —	nil nil	
Stannic Chloride	5 24	100 Boiling	< 1 < 1	— —	— —	
Succinic Acid	0-50 100	100 150	< 2 < 2	— —	— —	
Sulfuric Acid	0-75 80 80 77.5 75 77 80 75 65 70 75 76 77 77.5 60 65 70 58 62 64 68 69 71 72-74 75	20 20 30 60 50 50 50 80 100 100 100 100 100 100 130 130 140 Boiling Boiling Boiling Boiling Boiling Boiling Boiling Boiling	< 1 < 5 20-50 10-20 < 1 5-10 > 50 < 5 — < 2 < 5 < 10 < 20 > 50 — < 1 < 5 — < 5 < 5 < 5 < 5 5-10 10-20	< 1 — > 50 — — — > 50 — < 1 — — — — > 50 — — — < 1 — — — — — > 50 > 50	< 1 — > 50 < 10 — — > 50 < 5 < 5 < 5 — — > 50 < 5 — < 10 < 5 10-20 20-50 — — — — — —	B.P. = 140° C B.P. = 146° C B.P. = 152° C B.P. = 165° C B.P. = 167° C B.P. = 171° C B.P. = 189° C
Sulfuric Acid + 1000 ppm Fe^{3+} + 10,000 ppm Fe^{3+}	 60 60	 Boiling Boiling	 < 1 < 5	 — —	 — —	 B.P. = 142° C Added as $Fe_2(SO_4)_3$
Sulfuric Acid + 200-1000 ppm Fe^{3+} + 10,000 ppm Fe^{3+}	 65 65	 Boiling Boiling	 < 5 5-10	 — —	 — —	 B.P. = 152-155° C Added as $Fe_2(SO_4)_3$
Sulfuric Acid + 14 ppm-141 Fe^{3+} + 200 ppm + 1410 ppm-10,000 ppm Fe^{3+}	 70 70 70	 Boiling Boiling Boiling	 5-10 10-20 > 50	 — — —	 — — —	 B.P. = 167-171° C Added as $Fe_2(SO_4)_3$

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ZIRCADYNE® ZIRCONIUM CORROSION DATA

CORROSIVE MEDIA	CONCENTRATION %	TEMPERATURE °C	CORROSION RATE, mpy			REMARKS
			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Sulfuric Acid + 1000 ppm $FeCl_3$ + 10,000 ppm $FeCl_3$ + 20,000 ppm $FeCl_3$	 60 60 60	 Boiling Boiling Boiling	 < 5 < 5 20-50	 < 5 < 20 20-50	 < 20 20-50 > 50	B.P. = 138-142° C
Sulfuric Acid + 200 ppm $FeCl_3$ + 1000 ppm $FeCl_3$ + 10,000 ppm $FeCl_3$	 65 65 65	 Boiling Boiling Boiling	 < 5 < 5 < 5	 < 5 < 5 < 5	 < 20 < 20 < 20	B.P. = 152-155° C
Sulfuric Acid + 10 ppm $FeCl_3$ + 100 ppm $FeCl_3$ + 200 ppm $FeCl_3$ + 1000 ppm $FeCl_3$ + 10,000 ppm $FeCl_3$	 70 70 70 70 70	 Boiling Boiling Boiling Boiling Boiling	 < 20 < 20 < 20 < 20 20-50	 < 20 < 20 < 20 < 20 > 50	 > 50 > 50 > 50 > 50 > 50	B.P. = 167-171° C
Sulfuric Acid + 200 ppm Cu^{2+} + 1000-10,000 ppm Cu^{2+}	 60 60	 Boiling Boiling	 < 5 < 1	 — —	 — —	Added as $CuSO_4$
Sulfuric Acid + 200-10,000 ppm Cu^{2+}	 65	 Boiling	 < 5	 —	 —	Added as $CuSO_4$
Sulfuric Acid + 3 ppm Cu^{2+} + 27-226 ppm Cu^{2+}	 70 70	 Boiling Boiling	 5-10 > 50	 — —	 — —	Added as $CuSO_4$
Sulfuric Acid + 1000-10,000 ppm NO^-_3 + 50,000 ppm NO^-_3	 60 60	 Boiling Boiling	 < 5 > 50	 — —	 — —	Added as $NaNO_3$
Sulfuric Acid + 200-1000 ppm NO^-_3 + 10,000 ppm NO^-_3 + 50,000 ppm NO^-_3	 65 65 65	 Boiling Boiling Boiling	 < 5 10-20 > 50	 — — —	 — — —	Added as $NaNO_3$
Sulfuric Acid + 200 ppm NO^-_3 + 6000 ppm NO^-_3	 70 70	 Boiling Boiling	 5-10 20-50	 — —	 — —	Added as $NaNO_3$
Sulfuric Acid + 1000 ppm NO^-_3 + 10,000 ppm NO^-_3 + 50,000 ppm NO^-_3	 60 60 60	 Boiling Boiling Boiling	 < 5 10-20 > 50	 — — —	 — — —	Added as HNO_3
Sulfuric Acid + 1000 ppm NO^-_3 + 10,000-50,000 ppm NO^-_3	 65 65	 Boiling Boiling	 < 5 > 50	 — —	 — —	Added as HNO_3

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CORROSIVE MEDIA	CONCENTRATION %	TEMPERATURE °C	CORROSION RATE, mpy			REMARKS
			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Sulfuric Acid	Mixture	Room-100	< 1	—	—	1% H_2SO_4, 99% HNO_3
	Mixture	Room-100	nil	—	—	10% H_2SO_4, 90% HNO_3
	Mixture	Boiling	< 1	—	—	14% H_2SO_4, 14% HNO_3
	Mixture	100	> 50	> 50	> 50	25% H_2SO_4, 75% HNO_3
	Mixture	Room	< 1	—	—	50% H_2SO_4, 50% HNO_3
	Mixture	Boiling	> 50	> 50	> 50	68% H_2SO_4, 5% HNO_3
	Mixture	Boiling-135	10-20	10-20	> 50	68% H_2SO_4, 1% HNO_3
	Mixture	Room	> 50	> 50	> 50	75% H_2SO_4, 25% HNO_3
	Mixture	Boiling	< 1	—	—	7.5% H_2SO_4, 19% HCl
	Mixture	Boiling	< 1	—	—	34% H_2SO_4, 17% HCl
	Mixture	Boiling	< 1	—	—	40% H_2SO_4, 14% HCl
	Mixture	Boiling	1-5	—	—	56% H_2SO_4, 10% HCl
	Mixture	Boiling	< 1	—	—	60% H_2SO_4, 1.5% HCl
	Mixture	Boiling	< 5	—	—	69% H_2SO_4, 1.5% HCl
	Mixture	Boiling	10-20	—	—	69% H_2SO_4, 4% HCl
	Mixture	Boiling	< 20	—	—	72% H_2SO_4, 1.5% HCl
	Mixture	Boiling	> 50	—	> 50	20% H_2SO_4, 7% HCl with 50 ppm F impurities
Sulfuric Acid	2	225	< 1	—	< 1	
Sulfuric Acid	5	232	< 1	—	< 1	
Sulfuric Acid	10	225	< 1	—	—	
Sulfuric Acid	15	225	< 5	—	—	
Sulfuric Acid + 11% $SnSO_4$	10	103	< 1	—	< 1	
Sulfuric Acid + 1% $SnSO_4$	35	103	< 1	—	< 1	
Sulfuric Acid + 8% Fe	20	80	< 1	—	—	
Sulfurous Acid	6	Room	< 5	—	—	
	Saturated	192	5-50	—	—	
Sulfamic Acid	10	Boiling	nil	—	nil	B.P. = 101° C
Tannic Acid	25	35-100	< 1	—	—	
Tartaric Acid	10-50	35-100	< 1	—	—	
Trichloroacetic Acid	10-40	Room	< 2	—	—	
	100	Boiling	> 50	—	—	
	100	100	> 50	—	—	B.P. = 195° C
Tetrachloroethane	100	Boiling	< 5	—	—	B.P.=146°C symmetrical B.P.=129°C unsymmetrical
Trichloroethylene	99	Boiling	< 5	—	—	B.P. = 87° C

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CORROSIVE MEDIA	CONCENTRATION %	TEMPERATURE °C	CORROSION RATE, mpy			REMARKS
			Zircadyne 702	Zircadyne 704	Zircadyne 705	
Trisodium Phosphate	5-20	100	< 5	—	—	
Urea	50	Boiling	0.1	—	0.1	
Urea Reactor Mixture	Mixture	193	< 1	—	—	58 Urea 17 NH_3 15 CO_2 10 H_2O
Water - Sea (Pacific)	—	Boiling 200	nil nil	— —	nil —	pH = 7.6
White Liquuor	—	121, 177, 227	< 1	—	< 1	A mixture of NaOH, Na_2S, Na_2CO_3, etc.
Zinc Chloride	70 5-20 40	Boiling 35-Boiling Boiling-180	nil < 1 < 1	— — —	nil — < 1	

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