NeoNickel

Corrosion Tables

These tables of laboratory data are intended as guidance for what alloys might be tested in a given environment. They must NOT be used as the major basis for alloy selection, or as substitutes for competent corrosion engineering work.

Corrosion Rates in Caustic (NaOH)

Alloy	Notes	Concentration (%)	Temperature		Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
439	(boiling)	50	143	290	5x48hr	7.77	306	1
E-Brite®	(boiling)	50	143	290	5x48hr	0.00024	0.1	1
17-4PH®	condition H 1075	30	80	176	5x48hr	0.18	7	13
17-4PH	condition H 1075	50	80	176	5x48hr	0.10	4	13
17-4PH	condition H 1075	30	boiling		5x48hr	0.28	11	13
17-4PH	condition H 1075	50	boiling		5x48hr	14.2	560	13
2205	nitrogen purge	50	80	176	96hr	0.6	2.4	10
2205	nitrogen purge	50	85	185	96hr	0.12	4.8	10
2205	nitrogen purge	50	90	194	96hr	0.15	5.8	10
2205	(boiling)	50	143	290	5x48hr	0.61	24	1
304	(boiling)	50	143	290	5x48hr	4.65	183	1
304L	(boiling)	50	143	290	5x48hr	1.8	71	1
316	(boiling)	50	143	290	5x48hr	3.12	123	1
316L	(boiling)	50	143	290	5x48hr	1.98	78	1
316Ti	—	25	75	167	28 days	<0.01	0.4	19
316Ti	—	25	100	212	28 days	0.12	4.7	19
316Ti	(boiling)	25	104	219	28 days	0.63	25	19
316Ti	—	50	75	167	28 days	0.08	3	19
316Ti	—	50	100	212	28 days	0.35	14	19
316Ti	—	50	125	257	28 days	1.6	63	19
316Ti	(boiling)	50	146	295	28 days	8.0	315	19
904L	(boiling)	50	143	290	5x48hr	0.254	10	1
AL-6XN	(boiling)	50	143	290	5x48hr	0.41	16	1
2525LCN	(boiling)	50	146	295	28 days	1.35	53	19
33	—	25	75	167	28 days	<0.01	<0.4	19
33	—	25	100	212	28 days	<0.01	<0.4	19
33	—	25	104	219	28 days	<0.01	<0.4	19
33	—	50	75	167	28 days	<0.01	<0.4	19
33	—	50	100	212	28 days	<0.01	<0.4	19
33	—	50	125	257	28 days	<0.01	<0.4	19
33	(boiling)	50	146	295	28 days	<0.01	<0.4	19
C-276	(boiling)	50	143	290	5x48hr	0.452	17.8	1
625	(boiling)	50	143	290	5x48hr	0.061	2.4	1
400	quiet immersion	4	20	68	—	0.0041	0.16	15
400	plant test, receiving tank	75	135	275	—	0.043	1.7	15

Corrosion Rates in Caustic (NaOH) continued

Alloy	Notes	Concentration (%)	Temperature		Time	Corrosion Rate (mm/yr)	(Mils/yr)	Ref
nickel	—	50	40	100	—	0.00023	0.009	5
nickel	—	50	60	135	—	0.0005	0.02	5
nickel	—	50	55-75	130-165	—	0.0005	0.02	5
nickel	—	50	150	300	—	0.013	0.5	5
nickel	—	70-73	110	230	—	0.0025	0.1	5
nickel	—	70-73	90-115	190-240	—	0.0025	0.01	5
nickel	—	70-73	120	245	—	0.005	0.2	5
nickel	—	70-73	130	265	—	0.025	1	5
201	Static conditions. Above	(molten)	400	750	—	0.023	0.9	4
201	540C (1004F), dynamic	(molten)	500	932	—	0.053	1.3	4
201	conditions increase	(molten)	580	1076	—	0.064	2.5	4
201	rates dramatically	(molten)	680	1256	—	0.96	37.8	4

Temperature for Initiation of Crevice Corrosion in Ferric Chloride ($FeCl_3 \cdot 6H_2O$)

10% $FeCl_3 \cdot 6H_2O$, per ASTM G 48 Practice B, (PRE) N = Cr + 3.3Mo +30N

Alloy	MO (%)	Temperature C	F	Pitting Resistance Equivalent, (PRE) N	Ref
316L	2.1	-3	27	23	1
825	2.7	-3	27	30	1
317L	3.2	2	35	29	1
2205	3.1	20	68	38	1
317 LXN™	4.4	20	68	34	1
28	3.5	24	75	38	22
904L	4.4	24	75	35	1
904L	4.4	25	77	35	19
G	6.5	30	86	43	1
28	3.5	35	95	39	19
2507	4.0	35	95	47	19
1925hMo	6.2	40	104	47	19
33	1.4	40	104	50	19
AL-6XN	6.2	43	110	48	1
625	9.0	45	113	51	1
625	9.0	55	131	51	22
31	6.5	55	131	54	22
G-30	5.5	50	122	48	19
C-276	15.4	55	130	66	1

Corrosion Rates in Hydrochloric Acid (HCl)

Alloy	Notes	Conentration (%)	Temperature C	F	Time	Corrosion Rate (mm/yr)	(Mils/yr)	Ref
17-4PH	condition H 1075	0.5	35	95	5x48hr	0.08	3	13
17-4PH	condition H 1075	1	35	95	5x48hr	13.2	518	13
2205	plus 0.3% $FeCl_3$	1	30	86	96hr	0.01	0.2	10
2205	plus 0.3% $FeCl_3$	1	45	113	96hr	0.20	7.8	10
2205	plus 0.3% $FeCl_3$	1	55	131	96hr	0.38	15	10
2507	—	1	104	218	—	0.10	4	14
2507	—	1.3	40	104	28 days	0.02	0.8	21
2507	welded w 25.10.4.L	1.3	40	104	28 days	2.58	102	21
2507	—	3	30	86	—	0.10	4	14
317L	—	1	boiling		—	1.38	54.3	1

Corrosion Rates in Hydrochloric Acid (HCl) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
904L	–	1.3	40	104	28 days	0.47	18.5	21
904L	welded	1.3	40	104	28 days	0.54	21.3	21
1925hMo	–	1.3	40	104	28 days	<0.01	<0.4	21
1925hMo	welded w 625	1.3	40	104	28 days	0.42	16.5	21
AL-6XN	–	1	boiling		–	1.49	58.7	1
AL-6XN	–	2	23	78	–	0.003	0.12	1
AL-6XN	–	3	23	78	–	0.003	0.12	1
AL-6XN	–	4	23	78	–	0.003	0.12	1
AL-6XN	–	5	23	78	–	0.102	4.02	1
AL-6XN	–	6	23	78	–	0.216	8.82	1
AL-6XN	–	8	23	78	–	0.270	10.6	1
AL-6XN	–	3	52	126	–	0.553	21.8	1
AL-6XN	–	4	52	126	–	0.348	13.7	1
AL-6XN	–	5	52	126	–	1.698	66.9	1
AL-6XN	–	6	52	126	–	1.935	76.2	1
AL-6XN	–	pH 1.5	65.5	150	–	0.0009	0.035	1
AL-6XN	–	pH 1.0	65.5	150	–	0.0010	0.039	1
AL-6XN	–	pH 0.5	65.5	150	–	0.9139	36.0	1
AL-6XN	–	pH 1.0	79.4	175	–	0.0009	0.035	1
AL-6XN	–	pH 1.5	93.3	200	–	0.0008	0.031	1
AL-6XN	–	pH 1.0	93.3	200	–	0.0008	0.031	1
31	–	5	50	122	–	0.01	0.4	23
31	–	10	20	68	–	0.3	12	23
31	–	20	20	68	–	0.2	8	23
31	–	30	20	68	–	0.12	4.7	23
33	–	1.3	40	104	28 days	<0.01	<0.4	21
33	welded w 33	1.3	40	104	28 days	<0.01	<0.4	21
825	–	5	20	68	–	0.124	4.9	12
825	–	5	220	104	–	0.452	17.8	12
825	–	5	66	150	–	2.0	79	12
825	–	10	20	68	–	0.183	7.2	12
825	–	10	220	104	–	0.472	18.6	12
825	–	10	66	150	–	2.59	102	12
825	–	15	20	68	–	0.185	7.3	12
825	–	20	220	104	–	1.52	60	12
825	–	concentrated	220	104	–	12.2	480	12
825	–	concentrated	66	150	–	28.7	1130	12
RA333	–	2	27	80	–	0.17	6.6	3
RA333	–	5	27	80	–	0.22	8.5	3
RA333	–	15	27	80	–	0.17	6.6	3
RA333	–	25	27	80	–	0.16	6.4	3
RA333	–	37	27	80	–	0.58	23	3
RA333	–	2	66	150	–	1.5	60	3
RA333	–	5	66	150	–	5.0	196	3
RA333	–	15	66	150	–	4.9	194	3

Corrosion Rates in Hydrochloric Acid (HCl) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
G-30	—	5	50	122	—	0.49	19	23
G-30	—	10	20	68	—	0.5	20	23
G-30	—	20	20	68	—	0.5	20	23
G-30	—	30	20	68	—	0.5	20	23
C-276	—	1	boiling		—	0.25	10	7
C-276	—	1	boiling		—	0.34	13.4	7
C-276	—	1.5	boiling		—	0.74	29	7
C-276	—	2	90	194	—	0.025	1	7
C-276	—	2	boiling		—	1.55	61	7
C-276	—	3	boiling		—	1.78	70	7
C-22	—	1	boiling		—	0.076	3	7
C-22	—	1.5	boiling		—	0.28	11	7
C-22	—	2	90	194	—	nil	nil	7
C-22	—	2	boiling		—	1.55	61	7
C-22	—	3	90	194	—	<1	<1	7
C-22	—	3	boiling		—	2.13	84	7
625	—	1.3	40	104	28 days	<0.01	<0.4	21
625	welded w 625	1.3	40	104	28 days	0.09	3.5	21
625	—	5	66	150	—	1.8	71	16
625	—	10	66	150	—	2.1	81	16
625	—	15	66	150	—	1.7	65	16
625	—	20	66	150	—	1.3	50	16
625	—	25	66	150	—	1.0	38	16
625	—	30	66	150	—	0.9	34	16
625	—	concentrated	66	150	—	0.4	15	16
400	no aeration	0.5	boiling		10days	0.74	29	15
400	no aeration	1	boiling		10days	1.07	42	15
400	no aeration	5	boiling		10days	1.12	44	15
B-2	—	1	boiling		120hr	0.02	0.8	11
B-2	—	2	boiling		120hr	0.08	3	11
B-2	—	5	boiling		120hr	0.13	5	11
B-2	—	10	boiling		120hr	0.18	7	11
B-2	—	15	boiling		120hr	0.28	11	11
B-2	—	20	boiling		120hr	0.38	15	11

Corrosion Rates in Hydrofluoric Acid (HF)

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
316	—	3	21	70	—	1.25	49.1	1
316	—	5	21	70	—	2.33	91.8	1
316	—	5	40	104	—	7.8	306	1
316	—	1	50	122	—	1.82	71.8	1
316	—	2	50	122	—	5.3	209	1
316	—	5	50	122	—	15.9	626	1

Corrosion Rates in Hydrofluoric Acid (HF) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
904L	—	3	21	70	—	0.125	4.9	1
904L	—	5	21	70	—	0.18	7.2	1
904L	—	5	40	104	—	0.73	28.8	1
904L	—	1	50	122	—	0.23	9.2	1
904L	—	2	50	122	—	0.71	28	1
904L	—	3	50	122	—	0.85	33.5	1
904L	—	4	50	122	—	1.36	53.5	1
904L	—	5	50	122	—	1.82	71.6	1
904L	—	1	70	158	—	0.99	39	1
904L	—	2	70	158	—	2.0	80.2	1
904L	—	3	70	158	—	3.31	130	1
AL-6XN	—	3	21	70	—	0.08	3.2	1
AL-6XN	—	5	21	70	—	0.20	8.0	1
AL-6XN	—	5	40	104	—	0.82	32.4	1
AL-6XN	—	1	50	122	—	0.10	4.1	1
AL-6XN	—	2	50	122	—	0.43	16.9	1
AL-6XN	—	3	50	122	—	0.98	38.4	1
AL-6XN	—	4	50	122	—	1.42	55.9	1
AL-6XN	—	5	50	122	—	2.0	78.7	1
AL-6XN	—	1	70	158	—	0.54	21.1	1
AL-6XN	—	2	70	158	—	1.98	78	1
AL-6XN	—	3	70	158	—	3.05	120	1
C-276	—	2	70	158	—	0.23	9	7
C-276	—	5	70	158	—	0.25	10	7
C-22	—	2	70	158	—	0.23	9	7
C-22	—	5	70	158	—	0.36	14	7
625	—	2	70	158	—	0.51	20	7
625	—	5	70	158	—	0.41	16	7
400	saturated with air	25	30	86	24hr	1	37	17
400	saturated with air	25	80	176	24hr	0.28	11	17
400	saturated with air	50	30	86	24hr	0.2	8	17
400	saturated with air	50	80	176	24hr	1	39	17
400	purged with nitrogen	25	30	86	48hr	0.005	0.2	17
400	purged with nitrogen	25	80	176	48hr	0.061	2.4	17
400	purged with nitrogen	50	30	86	48hr	<0.003	<0.1	17
400	purged with nitrogen	50	80	176	48hr	0.01	0.5	17
400	vapor purged w. N_2	48	108	226	96hr	0.457	18.0	24
C71500	vapor purged w. N_2	48	108	226	96hr	0.083	3.25	24
C70600	vapor purged w. N_2	48	108	226	96hr	0.067	2.64	24

Corrosion Rates in Hydrofluoric Acid (HF) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
400	vapor purged w. N_2	50	60	140	35 day	0.462	18.2	24
400	vapor purged w. N_2	65	60	140	35 day	0.122	4.80	24
400	vapor purged w. N_2	70	60	140	35 day	0.137	5.4	24
400	anhydrous	—	16/27	60/80	6-40 day	0.081	3.2	24
400	anhydrous	—	27/38	80/100	6-40 day	0.23	0.9	24
400	anhydrous	—	82/88	100/200	6-40 day	0.12	4.7	24
C71500	anhydrous	—	27/38	80/100	6-40 day	0.05	2.0	24
C71500	anhydrous	—	54	130	6-40 day	0.008	0.3	24
C71500	anhydrous	—	82/88	180/190	6-40 day	0.25	10	24

Corrosion Rates in Nitric Acid (HNO_3)

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
17-4PH	condition H 1075	25	boiling		5x48hr	0.18	7	13
17-4PH	condition H 1075	50	boiling		5x48hr	1.2	47	13
17-4PH	condition H 1075	65	boiling		5x48hr	2.72	107	13
17-4PH	H 1075 + 1%HF	10	35	95	5x48hr	38	1500	13
2205	—	65	boiling		240hr	0.20	7.9	8
2205	—	65.3	boiling		—	0.13	5.3	9
304	—	65	116	241	—	0.23	9	1
304L	plus 3%HF	10	70	158	4hr	157	6410	1
304L	—	75	25	77	>21 days	<0.4	<17	20
304L	—	75	50	122	>21 days	0.4	17	20
304L	—	75	75	167	>21 days	4.8	189	20
304L	—	80	25	77	>21 days	<0.4	<17	20
304L	—	80	50	122	>21 days	0.4	17	20
304L	—	80	75	167	>21 days	3.5	138	20
304L	—	85	25	77	>21 days	1.3	52	20
304L	—	85	50	122	>21 days	1.3	52	20
304L	—	85	75	167	>21 days	15	590	20
316	plus 3%HF	5	68	155	—	4.18	165	1
316	—	10	90	194	—	0.22	9	1
316	plus 2%HCl	60	50	122	—	0.28	11	1
316	A 262 C	65	boiling		24hr	0.872	34	1
316L	—	65.3	boiling		—	0.25	9.8	9
316L	plus 3%HF	10	70	158	4hr	64.6	2540	1
316Ti	plus 3%HF	20	25	77	3x168hr	3.70	146	19
316Ti	plus 5%HF	20	25	77	3x168hr	6.90	272	19
316Ti	plus 7%HF	20	25	77	3x168hr	6.32	249	19
316Ti	plus 3%HF	20	50	122	168hr	19.2	758	19
316Ti	plus 5%HF	20	50	122	168hr	27.1	1070	19
316Ti	plus 7%HF	20	50	122	168hr	37.2	1465	19
317L	—	65.3	boiling		—	0.21	8.3	9

Corrosion Rates in Nitric Acid (HNO_3) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
310S	plus 3%HF	10	70	158	4hr	9.36	369	1
310L	—	75	25	77	>21 days	<0.4	<17	20
310L	—	75	50	122	>21 days	<0.4	<17	20
310L	—	75	75	167	>21 days	3.5	138	20
310L	—	80	25	77	>21 days	<0.4	<17	20
310L	—	80	50	122	>21 days	0.9	34	20
310L	—	80	75	167	>21 days	2.6	103	20
310L	—	85	25	77	>21 days	1.3	52	20
310L	—	85	50	122	>21 days	0.9	34	20
310L	—	85	75	167	>21 days	6.1	240	20
AL-6XN	plus 3%HF	5	68	155	—	1.55	61	1
AL-6XN	plus 3%HF	10	70	158	4hr	2.56	101	1
AL-6XN	A 262 C	65	boiling		24hr	0.738	29	1
28	—	12	90	194	504	<	<0.4	19
28	plus 0.9% HF	12	90	194	504	6.4	251	19
28	plus 3.5% HF	12	90	194	504	23	908	19
28	plus 3% HF	20	25	77	3x168	0.033	1.3	19
28	plus 5% HF	20	25	77	3x168	0.045	1.8	19
28	plus 7% HF	20	25	77	3x168	0.067	2.6	19
28	plus 3% HF	20	50	122	3x168	0.20	7.9	19
28	plus 5% HF	20	50	122	3x168	0.32	13	19
28	plus 7% HF	20	50	122	3x168	0.46	18	19
28	plus 0.4% HF	32	90	194	504	1.1	42	19
28	plus 0.4% HF	44.5	90	194	504	2.0	78	19
28	plus 0.4% HF	56	90	194	504	3.8	148	19
28	plus 0.4% HF	67.5	90	194	504	6.1	239	19
33	—	75	25	77	>21 days	<0.4	<17	20
33	—	75	50	122	>21 days	<0.4	<17	20
33	—	75	75	167	>21 days	1.3	52	20
33	—	80	25	77	>21 days	<0.4	<17	20
33	—	80	50	122	>21 days	<0.4	<17	20
33	—	80	75	167	>21 days	<0.4	<17	20
33	—	85	25	77	>21 days	<0.4	<17	20
33	—	85	50	122	>21 days	<0.4	<17	20
33	—	85	75	167	>21 days	3.1	121	20
33	—	12	90	194	504	<	<0.4	19
33	plus 0.9%HF	12	90	194	504	0.27	10.5	19
33	plus 3.5%HF	12	90	194	504	1.3	52	19
33	plus 3%HF	20	25	77	3x168hr	0.01	0.4	19
33	plus 5%HF	20	25	77	3x168hr	0.01	0.4	19
33	plus 7%HF	20	25	77	3x168hr	0.02	0.9	19
33	plus 3%HF	20	50	122	3x168hr	0.089	3.5	19
33	plus 5%HF	20	50	122	3x168hr	0.12	4.8	19
33	plus 7%HF	20	50	122	3x168hr	0.19	7.4	19
33	plus 0.4%HF	32	90	194	504	0.30	12	19
33	plus 0.4%HF	44.5	90	194	504	0.75	29	19
33	plus 0.4%HF	56	90	194	504	1.8	73	19
33	plus 0.4%HF	67.5	90	194	504	3.4	135	19

Corrosion Rates in Nitric Acid (HNO_3) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
800	plus 3%HF	10	70	158	4hr	18.6	732	1
20Cb-3	plus 3%HF	10	70	158	4hr	7.65	301	1
825	plus 3%HF	10	70	158	4hr	3.02	119	1
825	plus 1%HF	53	80	176	336hr	5.1	200	12
RA333	mill annealed	65	boiling		5x48hr	1.07	42	3
RA333	anneal + 1250F 1hr	65	boiling		5x48hr	3.96	156	3
RA333	anneal + 1700F 1hr	65	boiling		5x48hr	0.292	11.5	3
RA333	anneal + 1700F 1hr + 1250F 1 hr	65	boiling		5x48hr	0.292	11.5	3
G-30	plus 1%HF	20	80	176	—	0.85	34	6
G-30	plus 6%HF	20	80	176	—	3.6	140	6
G-30	plus 1%HF	50	80	176	—	4.9	192	6
G-30	plus 3%HF	10	70	158	4hr	1.04	41	1
G-30	plus 3%HF	5	68	155	—	0.741	29	1
G-30	—	10	boiling		—	0.02	0.7	6
G-30	—	60	boiling		—	0.13	53	6
G-30	—	12	90	194	504	<	<0.4	19
G-30	plus 0.9%HF	12	90	194	504	0.3	12.3	19
G-30	plus 3.5%HF	12	90	194	504	1.3	5.3	19
G-30	plus 0.4%HF	32	90	194	504	0.55	21.5	19
G-30	plus 0.4%HF	44.5	90	194	504	1.61	63.5	19
G-30	plus 0.4%HF	56	90	194	504	2.66	105	19
G-30	plus 0.4%HF	67.5	90	194	504	5.0	197	19
C-276	—	10	90	194	—	<0.01	0.2	2
C-276	plus 3%HF	10	70	158	4hr	6.71	264	1
C-276	—	65	116	241	—	0.74	29	2
C-276	plus 2%HCl	60	50	122	—	0.21	8.2	2
C-22	plus 3%HF	10	70	158	4hr	1.71	67	1
625	plus 3%HF	10	70	158	4hr	3.96	156	1
625	—	65	boiling		—	0.76	30	16
690	—	12	90	194	504	<0.01	<0.4	19
690	plus 0.9%HF	12	90	194	504	0.678	27	19
690	plus 3.5%HF	12	90	194	504	7.06	278	19
690	plus 0.4%HF	32	90	194	504	1.62	64	19
690	plus 0.4%HF	44.5	90	194	504	2.19	86.3	19
690	plus 0.4%HF	56	90	194	504	5.22	205	19
690	plus 0.4%HF	67.5	90	194	504	8.26	325	19

Corrosion Rates in Phosphoric Acid (H_3PO_4)

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
17-4PH	condition H 1075	2.5	boiling		5x48hr	nil	nil	13
17-4PH	condition H 1075	20	boiling		5x48hr	0.025	1	13
17-4PH	condition H 1075	50	boiling		5x48hr	0.08	3	13
17-4PH	condition H 1075	70	boiling		5x48hr	1.5	60	13
2205	—	70	110	230	—	0.22	8.7	9

Corrosion Rates in Phosphoric Acid (H_3PO_4) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
304	—	50	boiling		5x48hr	0.18	7	13
304	—	70	boiling		5x48hr	0.81	32	13
316	—	20	boiling		—	0.183	7.2	1
316	—	54	boiling		—	0.580	2.28	1
316	—	60	boiling		—	0.305	12	1
316L	—	70	110	230	—	3.9	154	9
317L	—	70	110	230	—	2.4	95	9
310L	—	85	100	212	24hr	0.15	5.9	19
310L	—	85	100	212	168hr	0.25	9.8	19
310L	—	85	154	309	24hr	>200	>7900	19
654 SMO	—	85	100	212	24hr	0.39	15	19
654 SMO	—	85	100	212	168hr	0.17	6.7	19
654 SMO	—	85	154	307	24hr	4.0	157	19
AL-6XN	—	10	120	248	120hr	0.021	0.81	1
AL-6XN	—	10	135	275	120hr	0.197	7.76	1
AL-6XN	—	10	150	302	120hr	0.400	15.75	1
AL-6XN	—	20	boiling		5x48hr	0.006	0.24	1
AL-6XN	—	54	boiling		—	0.015	0.059	1
AL-6XN	plus 800ppm Cl^-	70	100	212	168hr	1.22	48	1
AL-6XN	plus 1% HF	70	100	212	168hr	0.518	20.4	1
28	—	85	100	212	24hr	0.19	7.5	19
28	—	85	100	212	168hr	0.05	2.0	19
28	—	85	154	309	24hr	1.4	55	19
31	$\%P_2O_5$	54	120	250	—	0.05	2	23
33	—	85	100	212	24hr	0.2	7.9	19
33	—	85	100	212	168hr	0.08	3.15	19
33	—	85	154	309	24hr	0.07	42	19
825	chemically pure	60	boiling		3x20hr	0.17	6.8	12
825	chemically pure	70	boiling		4x20hr	0.18	7.1	12
825	chemically pure	85	boiling		4x20hr	1.3	50	12
825	wet process acid +20%HF	20	21-29	70-85	624hr	0.036	1.4	12
G-30	$\% P_2O_5$	44	116	241	—	0.18	7.0	6
G-30	$\% P_2O_5$ + 2000ppm Cl^-	44	116	241	—	0.19	7.7	6
G-30	$\% P_2O_5$	52	149	300	—	0.70	28	6
G-30	$\% P_2O_5$ + 2000ppm Cl^-	54	116	241	—	0.18	7	6
G-30	—	85	100	212	24hr	0.30	12	19
G-30	—	85	100	212	168hr	0.04	1.6	19
G-30	—	85	154	309	24hr	1.33	52	19
C-22	—	85	100	212	24hr	0.19	7.5	19
C-22	—	85	100	212	168hr	0.05	2.0	19
C-22	—	85	154	309	24hr	1.08	42.5	19

NeoNickel

Corrosion Tables

Corrosion Rates in Phosphoric Acid (H_3PO_4)

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
625	plus 0.8% HF	55	boiling		48hr	0.42	16.5	16
B-2	chemically pure	10	boiling		120hr	0.05	2	11
B-2	chemically pure	30	boiling		120hr	0.08	3	11
B-2	chemically pure	50	boiling		120hr	0.15	6	11
B-2	chemically pure	85	boiling		120hr	0.63	25	11

Corrosion Rates in Sulphuric Acid (H_2SO_4)

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
17-4PH	condition H 1075	2	35	95	5x48hr	nil	nil	13
17-4PH	condition H 1075	5	35	95	5x48hr	0.28	11	13
17-4PH	condition H 1075	1	80	176	5x48hr	0.025	1	13
17-4PH	condition H 1075	2	80	176	5x48hr	0.33	13	13
17-4PH	condition H 1075	98	35	95	5x48hr	nil	nil	13
17-4PH	condition H 1075	98	80	176	5x48hr	0.18	7	13
2205	nitrogen purge	10	55	131	96hr	0.06	2.3	10
2205	nitrogen purge	10	60	140	96hr	0.17	6.7	10
2205	nitrogen purge	10	70	158	96hr	0.32	13	10
2205	nitrogen purge	60	15	59	96hr	4.0	157	10
2205	nitrogen purge	96.4	20	68	96hr	0.11	4.4	10
2205	nitrogen purge	96.4	25	77	96hr	0.14	5.4	10
2507	plus 2000 ppm Cl^-	10	67	153	—	0.10	4	14
2507	plus 2000 ppm Cl^-	20	23	73	—	0.10	4	14
304	—	1	35	95	5x48hr	0.71	28	13
304	—	5	35	95	5x48hr	6.1	240	13
304	—	1	80	176	5x48hr	8.9	350	13
304	—	95	30	86	—	0.28	11	2
304	plant test ≥1 m/s	96-98.5	135-140C		14 days	0.18	7.1	21
316	—	10	boiling		5x48hr	9.42	371	1
316	reagent grade	10	80	176	5x48hr	2.3	91	18
316	" + 59ppm Cl^-	10	80	176	5x48hr	5.56	219	18
316	" + 119ppm Cl^-	10	80	176	5x48hr	5.6	221	18
316	" + 1187ppm Cl^-	10	80	176	5x48hr	2.0	80	18
316	" + 10600ppm Cl^-	10	80	176	5x48hr	6.3	250	18
316	reagent grade	30	80	176	5x48hr	60.34	2375	18
316	" + 80ppm Cl^-	30	80	176	48hr	dissolved		18
316	" + 135ppm Cl^-	30	80	176	48hr	dissolved		18
316	" + 1277ppm Cl^-	30	80	176	5x48hr	10.4	407	18
316	"+ 10900 ppm Cl^-	30	80	176	5x48hr	8.84	348	18
316Ti	plant test ≥1 m/s	96-98.5	135-140C		14 days	0.24	9.4	21
316Ti	plant test ≥1.2 m/s	99.1	150	302	134 days	0.81	32	21
Nitronic 50	industrial grade	80	80	176	3x48hr	0.05	2.0	18
Nitronic 50	"	80	100	212	48hr	66.5	2620	18
Nitronic 50	"	93	100	212	3x48hr	9.25	364	18
Nitronic 50	"	93	120	248	3x48hr	9.73	383	18
Nitronic 50	"	98	100	212	3x48hr	0.24	9.4	18
Nitronic 50	"	98	120	248	3x48hr	0.23	9.3	18

Corrosion Rates in Sulphuric Acid (H_2SO_4) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
A 611	—	98	100	212	168hr	0.02	0.79	19
A 611	—	98	125	257	168hr	0.36	14	19
A 611	—	98	150	302	168hr	0.81	32	19
A 611	—	98	175	347	168hr	0.70	28	19
A 611	—	98	200	392	168hr	0.61	24	19
A 611	plant test ≥1m/s	98-98.5	135-140C		14 days	0.03	1.2	21
1018	plus	15	71	160	—	7.44	293	3
20Cb-3	0.15%	15	71	160	—	0.127	5	3
RA330	Oakite®	15	71	160	—	0.461	18.8	3
RA333	PC-10	15	71	160	—	0.241	9.85	3
600	inhibitor	15	71	160	—	0.205	8.07	3
310L	—	98	100	212	168hr	0.38	15	19
310L	—	98	125	257	168hr	0.43	17	19
310L	—	98	150	302	168hr	0.98	39	19
310L	—	98	175	347	168hr	0.38	15	19
310L	—	98	200	392	168hr	0.07	2.8	19
AL-6XN	—	pH 1.5	65.6	150	—	0.0007	0.029	1
AL-6XN	—	pH 1.0	65.6	150	—	0.0007	0.029	1
AL-6XN	—	pH 0.5	65.6	150	—	0.0013	0.053	1
AL-6XN	—	pH 0.5	79.4	175	—	0.0013	0.053	1
AL-6XN	—	pH 1.5	93.3	200	—	0.0013	0.053	1
AL-6XN	—	pH 1.0	93.3	200	—	0.0027	0.11	1
AL-6XN	—	pH 0.5	93.3	200	—	0.541	21.3	1
AL-6XN	—	10	boiling		5x48hr	2.14	84.4	1
AL-6XN	—	10	boiling		5x48hr	2.34	92.3	1
904L	—	10	boiling		5x48hr	2.52	99.4	1
904L	—	10	boiling		5x48hr	2.56	101	1
904L	reagent grade	5	80	176	3x48hr	0.005	0.2	18
904L	"	10	80	176	3x48hr	0.013	0.5	18
904L	" + 10,000ppm Cl^-	10	80	176	3x48hr	2.87	113	18
904L	" + 10,000ppm Cl^-	30	80	176	3x48hr	4.01	158	18
904L	"	45	80	176	3x48hr	1.9	75	18
904L	"	90	80	176	3x48hr	3.86	152	18
904L	"	96	80	176	3x48hr	3.30	130	18
alloy 31	technical grade	20	60	140	—	0.001	0.04	22
alloy 31	technical grade	40	60	140	—	0.002	0.08	22
alloy 31	technical grade	60	60	140	—	0.002	0.08	22
alloy 31	technical grade	80	60	140	—	0.004	0.16	22
alloy 31	technical grade	20	80	176	—	0.002	0.08	22
alloy 31	technical grade	40	80	176	—	0.004	0.16	22
alloy 31	technical grade	60	80	176	—	0.010	0.39	22
alloy 31	technical grade	80	80	176	—	0.019	0.75	22
alloy 31	technical grade	20	100	212	—	0.007	0.28	22
alloy 31	technical grade	40	100	212	—	0.016	0.63	22
alloy 31	technical grade	60	100	212	—	0.025	0.98	22
alloy 31	technical grade	80	100	212	—	6.220	245	22

Corrosion Rates in Sulphuric Acid (H_2SO_4) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
33	—	98	100	212	168hr	0.04	1.6	19
33	—	98	125	257	168hr	0.07	2.8	19
33	—	98	150	302	168hr	0.08	3.2	19
33	—	98	175	347	168hr	0.16	6.3	19
33	—	98	200	392	168hr	0.04	1.6	19
33	plant test ≥1m/s	96-98.5	135-140C		14 days	<0.01	<0.4	21
33	plant test ≥1.2m/sec	99.1	150	302	134 days	<0.01	<0.4	21
20Cb-3	reagent grade	5	80	176	3x48hr	0.0038	0.15	18
20Cb-3	"	10	80	176	3x48hr	0.066	2.6	18
20Cb-3	"	10	80	176	5x48hr	0.065	2.5	18
20Cb.3	" + 59ppm Cl^-	10	80	176	5x48hr	0.098	3.9	18
20Cb-3	" + 119ppm Cl^-	10	80	176	5x48hr	0.094	3.7	18
20Cb-3	" + 594ppm Cl^-	10	80	176	5x48hr	0.18	7	18
20Cb-3	" + 859ppm Cl^-	10	80	176	5x48hr	0.34	14	18
20Cb-3	" + 1187ppm Cl^-	10	80	176	5x48hr	0.37	15	18
20Cb-3	" + 10600ppm Cl^-	10	80	176	5x48hr	1.1	43	18
20Cb-3	"+ 10,000ppm Cl^-	10	80	176	3x48hr	0.97	38	18
20Cb-3	reagent grade	30	80	176	5x48hr	0.24	9.4	18
20Cb-3	" + 32ppm Cl^-	30	80	176	5x48hr	0.21	8.2	18
20Cb-3	" + 85ppm Cl^-	30	80	176	5x48hr	0.22	8.9	18
20Cb-3	" + 1055ppm Cl^-	30	80	176	5x48hr	0.42	16	18
20Cb-3	" + 10,625ppm Cl^-	30	80	176	5x48hr	2.0	80	18
20Cb-3	" + 10,000ppm Cl^-	30	80	176	3x48hr	1.8	70	18
20Cb-3	"	45	80	176	3x48hr	0.16	6.3	18
20Cb-3	"	90	80	176	3x48hr	0.343	13.5	18
20Cb-3	"	96	80	176	3x48hr	0.48	19	18
N08020	(control alloy)	60	50	122	96hr	0.02	0.9	10
825	C.P. acid	40	50	122	168hr	0.013	0.5	12
825	C.P. acid	40	100	212	168hr	0.36	14.0	12
825	C.P. acid	40	boiling		48hr	0.28	11.0	12
825	C.P. acid	50	50	122	168hr	0.025	1.0	12
825	C.P. acid	50	100	212	168hr	0.36	14.0	12
825	C.P. acid	50	boiling		48hr	0.51	20.0	12
825	C.P. acid	60	50	122	168hr	0.10	4.0	12
825	C.P. acid	60	100	212	48hr	0.51	20.0	12
825	C.P. acid	60	boiling		48hr	3.05	120	12
825	C.P. acid	80	50	122	168hr	0.13	5.0	12
825	C.P. acid	80	100	212	168hr	0.51	20.0	12
825	C.P. acid	80	boiling		48hr	34.5	1360	12
825	plant acid	25.3	50	122	168hr	0.013	0.5	12
825	plant acid	25.3	boiling		48hr	0.41	16	12
825	plant acid	50.3	50	122	168hr	0.13	5.0	12
825	plant acid	50.3	100	212	168hr	1.3	50	12
825	plant acid	50.3	boiling		48hr	48.8	1920	12
825	plus 22% HNO_3	50	66	150	288hr	0.013	0.5	12
825	plus 22% HNO_3	50	83	182	240hr	0.11	4.3	12
825	plant test ≥1m/s	99.1	150	302	134 days	1.46	57.5	21

Corrosion Rates in Sulphuric Acid (H_2SO_4) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
G-30	—	25	boiling		—	0.19	7.5	6
G-30	—	50	107	225	—	1.05	42	6
G-30	—	80	52	125	—	0.3	12	6
G-30	—	99	130	226	—	0.86	34	6
G-30	—	99	140	284	—	1.2	46	6
G-30	plus 10%HNO_3	50	boiling		—	0.41	16	6
G-30	plus 5%HNO_3	60	boiling		—	1.1	45	6
G-30	plus 0.5%HNO_3	70	boiling		—	3.4	133	6
G-30	plus 0.5%HNO_3	70	boiling		—	3.4	133	6
G-30	plant test ≥1/ms	96-98.5	135-140C		14 days	0.08	3.1	21
C-276	—	10	boiling		—	1.1	43	7
C-276	—	20	79	174	—	0.076	3	7
C-276	—	20	boiling		—	1.1	42	7
C-276	—	30	79	174	—	0.10	4	7
C-276	—	30	boiling		—	1.4	55	7
C-276	—	70	38	100	—	nil	nil	7
C-276	—	95	30	86	—	<0.01	0.12	2
C-276	technical grade	20	60	140	—	0.015	0.59	22
C-276	technical grade	40	60	140	—	0.036	1.4	22
C-276	technical grade	60	60	140	—	0.031	1.2	22
C-276	technical grade	80	60	140	—	0.021	0.83	22
C-276	technical grade	20	80	176	—	0.102	4.02	22
C-276	technical grade	40	80	176	—	0.081	3.19	22
C-276	technical grade	60	80	176	—	0.088	3.46	22
C-276	technical grade	80	80	176	—	0.372	14.6	22
C-276	technical grade	20	100	212	—	0.172	6.77	22
C-276	technical grade	40	100	212	—	0.247	9.72	22
C-276	technical grade	60	100	212	—	0.287	11.3	22
C-276	technical grade	80	100	212	—	6.220	245	22
C-22	industrial grade	10	boiling		3x48hr	0.12	4.5	18
C-22	" +10,000ppm Cl^-	10	boiling		3x48hr	3.26	128	18
C-22	—	10	boiling		—	0.28	11	7
C-22	—	20	79	174	—	0.025	1	7
C-22	—	20	boiling		—	0.84	33	7
C-22	—	30	79	174	—	0.076	3	7
C-22	—	30	boiling		—	1.6	64	7
C-22	—	70	38	100	—	nil	nil	7
625	—	15	80	176	—	0.19	7.4	16
625	—	50	80	176	—	0.43	17	16
625	—	60	80	176	—	0.71	28	16
625	—	70	80	176	—	1.6	64	16
625	—	80	80	176	—	2.3	90	16
625	plus 4.9% HF	28	49-79	120-175	—	1.2	49	16
400	boiling	5	101	214	23hr	0.086	3.4	15
400	boiling	10	102	216	23hr	0.061	2.4	15
400	boiling	19	104	219	23hr	0.19	7.5	15
400	boiling	50	123	253	20hr	16.5	650	15
400	boiling	75	182	360	20hr	58.4	2300	15
400	boiling	96	293	560	3hr	83.8	3300	15

Corrosion Rates in Sulphuric Acid (H_2SO_4) continued

Alloy	Notes	Concentration (%)	Temperature C	Temperature F	Time	Corrosion Rate (mm/yr)	Corrosion Rate (Mils/yr)	Ref
B-2	—	2	boiling		120hr	<0.02	0.5	11
B-2	—	5	boiling		120hr	0.08	3	11
B-2	—	10	boiling		120hr	0.05	2	11
B-2	—	20	boiling		120hr	<0.02	0.7	11
B-2	—	30	boiling		120hr	<0.02	0.7	11
B-2	—	40	boiling		120hr	<0.03	0.9	11
B-2	—	50	boiling		120hr	0.03	1	11
B-2	—	60	boiling		120hr	0.05	2	11
B-2	—	70	boiling		120hr	0.23	9	11

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