

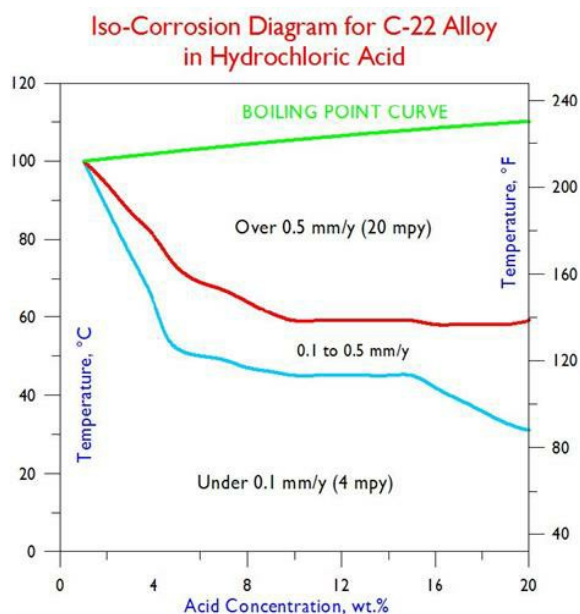


2.5	-	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	-	-	-
3.5	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-
4.5	-	-	-	-	-	-	-	-	-
5	-	-	<0.01	-	0.44	1.44	3.02	-	8.99
7.5	-	-	-	-	-	-	-	-	-
10	-	-	0.01	0.28	0.98	1.99	4.39	-	11.68
15	-	-	-	-	0.98	1.91	-	-	11.02
20	-	-	0.20	0.32	0.90	1.72	3.38	-	9.73

All corrosion rates are in millimeters per year (mm/y); to convert to mils (thousandths of an inch) per year, divide by 0.0254.

Data are from Corrosion Laboratory Jobs 442-82 and 176-83.

All tests were performed in reagent grade acids under laboratory conditions; field tests are encouraged prior to industrial use.



### Nitric Acid

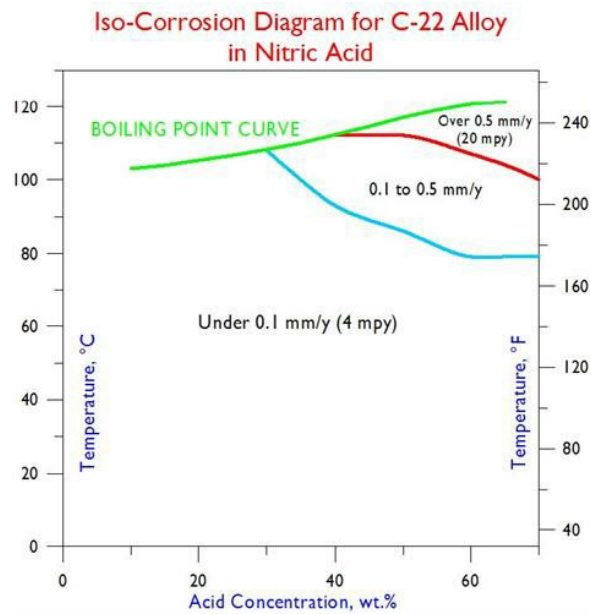
Conc. Wt.%	50°F	75°F	100°F	125°F	150°F	175°F	200°F	225°F	Boiling
	10°C	24°C	38°C	52°C	66°C	79°C	93°C	107°C	
10	-	-	-	-	<0.01	-	0.01	-	0.01
20	-	-	-	-	0.01	-	0.02	-	0.06
30	-	-	-	-	0.01	-	0.02	-	0.13
40	-	-	-	-	0.02	0.03	0.09	-	0.26
50	-	-	-	-	-	0.05	0.14	0.33	0.59
60	-	-	-	-	0.06	0.08	0.19	0.57	1.09
70	-	-	-	-	0.05	0.11	0.33	0.71	2.53

All corrosion rates are in millimeters per year (mm/y); to convert to mils (thousandths of an inch) per

year, divide by 0.0254.

Data are from Corrosion Laboratory Jobs 443-82 and 47-04.

All tests were performed in reagent grade acids under laboratory conditions; field tests are encouraged prior to industrial use.



### Phosphoric Acid

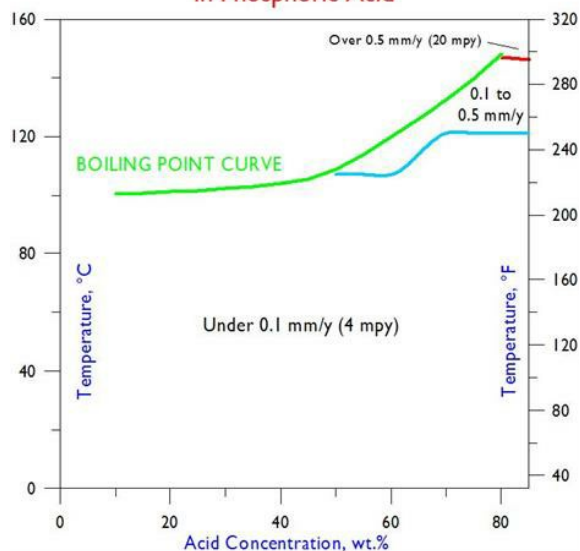
Conc. Wt.%	125°F	150°F	175°F	200°F	225°F	250°F	275°F	300°F	Boiling
	52°C	66°C	79°C	93°C	107°C	121°C	135°C	149°C	
50	-	-	-	-	-	-	-	-	0.07
60	-	-	-	-	0.08	-	-	-	0.16
65	-	-	-	-	-	-	-	-	-
70	-	-	-	-	0.07	0.13	-	-	0.23
75	-	-	-	-	0.05	0.12	-	-	0.19
80	-	-	-	-	0.06	0.12	0.16	-	0.25
85	-	-	-	-	0.07	0.12	0.20	-	0.66

All corrosion rates are in millimeters per year (mm/y); to convert to mils (thousandths of an inch) per year, divide by 0.0254.

Data are from Corrosion Laboratory Jobs 444-82 and 46-04.

All tests were performed in reagent grade acids under laboratory conditions; field tests are encouraged prior to industrial use.

### Iso-Corrosion Diagram for C-22 Alloy in Phosphoric Acid



### Sulfuric Acid

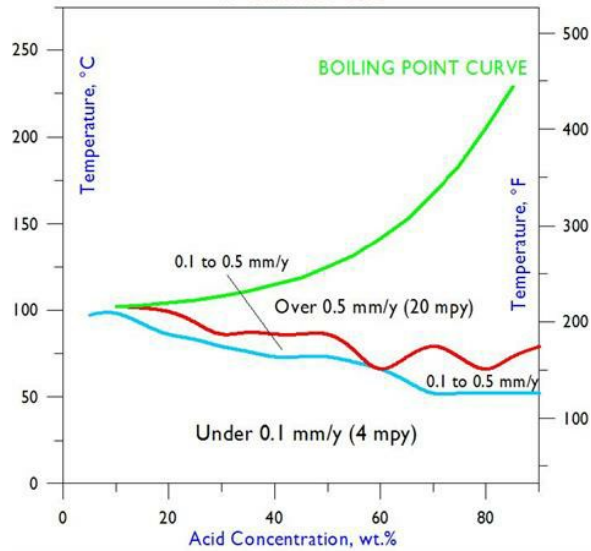
Conc. Wt.%	75°F	100°F	125°F	150°F	175°F	200°F	225°F	250°F	275°F	300°F	350°F	Boiling
	24°C	38°C	52°C	66°C	79°C	93°C	107°C	121°C	135°C	149°C	177°C	
1	-	-	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	-	0.01	-	-	-	-	-	0.13
3	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	<0.01	0.01	0.03	-	-	-	-	-	0.23
10	-	-	-	-	0.02	0.04	-	-	-	-	-	0.29
20	-	-	-	0.01	0.03	0.28	-	-	-	-	-	0.83
30	-	-	-	0.01	0.09	0.68	-	-	-	-	-	1.89
40	-	-	0.01	0.01	0.31	0.87	-	-	-	-	-	3.99
50	-	-	-	0.02	0.40	0.77	2.18	-	-	-	-	9.98
60	-	-	0.01	-	0.67	0.95	2.69	7.62	-	-	-	-
70	-	-	-	0.28	0.56	0.94	3.07	14.94	-	-	-	-
80	-	-	0.09	-	1.44	2.16	3.68	3.58	-	-	-	-
90	-	-	-	0.34	0.89	1.80	6.27	4.24	-	-	-	-
96	-	-	-	0.10	-	1.10	-	-	-	-	-	-

All corrosion rates are in millimeters per year (mm/y); to convert to mils (thousandths of an inch) per year, divide by 0.0254.

Data are from Corrosion Laboratory Jobs 319-82, 445-82, and 19-14.

All tests were performed in reagent grade acids under laboratory conditions; field tests are encouraged prior to industrial use.

**Iso-Corrosion Diagram for C-22 Alloy  
in Sulfuric Acid**



**Reagent Grade Solutions, mm/y**

Chemical	Conc.	100°F	125°F	150°F	175°F	200°F	Boiling
		38°C	52°C	66°C	79°C	93°C	
Acetic Acid	99	-	-	-	-	-	0.00
Formic Acid	88	-	-	-	-	-	<0.01
Hydrobromic Acid	2.5	-	-	-	-	-	0.02
	5	-	-	-	-	-	0.76
	7.5	-	-	-	0.01	-	-
	10	-	-	-	0.01	-	-
	15	-	0.01	<0.01	0.88	-	-
	20	-	0.01	0.46	0.80	-	-
	25	<0.01	0.20	0.29	0.58	-	-
	30	0.11	0.23	0.29	0.59	-	-
Hydrochloric Acid	40	0.07	0.13	0.21	0.34	-	-
	1	-	-	-	-	0.01	0.06
	5	<0.01	-	0.44	-	-	-
	7.5	-	-	-	-	-	-
	10	0.01	0.28	0.98	-	-	-
	15	-	-	-	-	-	-
Hydrofluoric Acid*	20	0.20	0.32	0.90	-	-	-
	5	0.04	0.15	0.47	0.58	-	-
	10	0.09	0.33	0.64	0.78	-	-
Nitric Acid	20	0.22	0.53	0.95	1.65	-	-
	10	-	-	<0.01	-	0.01	0.01
	20	-	-	0.01	-	0.02	0.06
	30	-	-	0.01	-	0.02	0.13
	40	-	-	0.02	-	0.09	0.26
	50	-	-	-	-	0.14	0.59
60	-	-	0.06	-	0.19	1.09	

	65	-	-	-	-	-	-
	70	-	-	0.05	-	0.33	2.53
<b>Phosphoric Acid</b>	50	-	-	-	-	-	0.07
	60	-	-	-	-	-	0.16
	70	-	-	-	-	-	0.23
	75	-	-	-	-	-	0.19
	80	-	-	-	-	-	0.25
	85	-	-	-	-	-	0.66
<b>Sulfuric Acid</b>	10	-	-	-	0.02	0.04	0.29
	20	-	-	0.01	0.03	0.28	0.83
	30	-	-	0.01	0.09	0.68	-
	40	-	-	0.01	0.31	0.87	-
	50	-	-	0.02	0.40	0.77	-
	60	-	-	-	0.67	0.95	-
	70	-	-	0.28	0.56	0.94	-
	80	-	-	-	1.44	2.16	-
	90	-	-	0.34	0.89	1.80	-
	96	-	-	0.10	-	1.10	-

\*Hydrofluoric acid can also induce internal attack of nickel alloys; these values represent only external attack.