YAMATAKE

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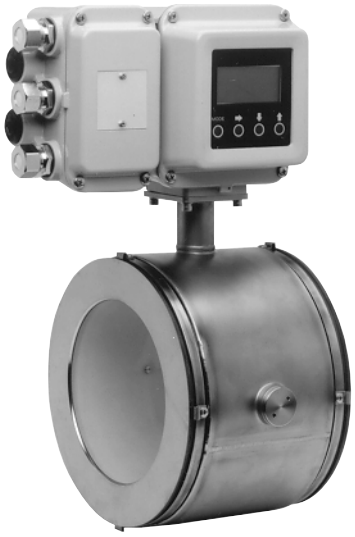
Material Selection Guide
Electromagnetic Flowmeter

Process Wetted Materials



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Precautions to be arare of when using the MagneW wetted material selection guide

The corrosiveness of fluids used under process conditions may vary due to the type and amount of impurities present, process temperature, variances in flow rate and concentration of process fluids. For these reasons, you should refer to this selection table as a "primer" guide.

In order to select an appropriate process wetted material, it is suggested to implement a corrosion test in the field.

Definition of symbols in the table

Symbol

A	Applicable (recommended material), lower than 100°C at the indicated concentration.
B	There are some limitations to concentration and temperature, applicable up to the specified temperature and concentration.
C	Applicable only as the grounding ring material. Note 3)
D	Not applicable
-	No data

Note:

1) The rate of corrosion which is applicable for electrode material is limited to 0.05mm/year or less. Even though the corrosion rate may be lower than 0.05mm/year, materials which may experience grain boundary corrosion or stress corrosion are not applicable.

2) The rate of corrosion which is applicable for grounding ring material is limited to 0.5mm/year or less.

3) Applicable up to the specified temperature. If temperature is not specified, materials are applicable up to 100°C.

3. Selection of lining materials

The lining materials for MagneW300/SMT3000 are Teflon PFA, ETFE, alumina ceramic polyurethane rubber and chloroprene rubber (for SMT3000, Teflon PFA only).
The general characteristics of each are shown in Table 1. The anti-abrasion and anti-corrosion characteristics of chloroprene rubber are comparable to those of polyurethane rubber.
Refer to Table 2 for a detailed selection of materials.

4. Selection of electrode materials

The general characteristics of electrode materials are shown in Table 1.
Refer to Table 2 for a detailed selection of materials.
Please pay full attention to the special notes regarding process conditions writter in Table 2.

5. Selection of grounding ring materials

It is recommended to select the same material for grounding ring as for electrode.
The purpose of the grounding ring is to ground process fluids and thus it is accepted that the anti-corrosion characteristic of the grounding ring material is less than that of the electrode.

Table 1 Characteristics of process wetted materials

Wetted parts	No.	Material	Main components	Description	Recommended environment
1. Lining materials	1-1	Polyurethane rubber	Polyurethane	A synthetic elastic rubber. Excellent abrasion resistance. Less chemical resistance.	-40°C to +50°C
	1-2	Teflon ETFE	Tetrafluoroethylene resin	A synthetic polymer containing fluorine (F) in the molecule. ETFE is superior to PFA in terms of mechanical strength and abrasion resistance. ETFE is slightly inferior to PFA in terms of heat resistance and corrosion resistance.	-40°C to +120°C
	1-3	Teflon PFA	Tetrafluoroethylene resin	A synthetic polymer containing fluorine (F) in the molecule. Resistant to almost all chemicals except for high temperature fluorine, some alkalis and some halogen compounds. Excellent heat resistance, particular low friction characteristic and anti-adhesion characteristic.	-40°C to +160°C (size: 15~200mm) -40°C to +100°C (size: 2.5~10mm) -40°C to +120°C (size: 250~600mm)
	1-4	Ceramic	Alumina ceramic Al_2O_3: 99.7%	Excellent abrasion resistance. Suitable for high temperature and high pressure applications. Corrosion resistance is slightly lower than that of teflon PFA. Not applicable for alkali.	process temperature: -40°C to +180°C process pressure: -0.098~+3.92MPa
2. Electrode / Grounding ring materials	2-1	SUS316L	Cr: 17% Ni: 13% Mo: 2.25% C: <0.03% Fe: remainder	Resistant to corrosion in weak alkali or acid. Not applicable in inorganic/organic acid and chloride.	water (tap and sewage) weak alkali (e.g. caustic soda of 40% or less)
	2-2	Titanium	Ti: >99.3%	Resistant to corrosion in oxidizing atmosphere. In paticular, applicable for process fluids containing chlorine ion. Not applicable for sulfuric acid and nitric acid.	chloride solutions (e.g. ammonium chloride, potassium chloride, ferrous chloride) sea water
	2-3	Hastelloy C-276	Mo: 16% Cr: 16% Fe: 5% W: 4% Ni: remainder	A wide range of use since it is applicable for moderate oxidizing atmosphere and reducing atmosphere. Weak to sulfides and sulfuric acid.	organic and inorganic acids, alkalis
	2-4	Tantalum	for PFA/ETFE lining Ta: >99.5% for ceramic lining Ta: 905%, W: 10%	Resistant to corrosion in strongly oxidizing and reducing atmospheres. Not applicable for alkalis, fluorides and fuming sulfuric acid. Since insulation film may be generated on the surface of electrode, pay full considerations of use of the flowmeter when selecting this material.	hydrochloric acid, sulfuric acid, nitric acid, aqua regia
	2-5	Platinum-iridium	Pt: 90% Ir: 10%	Resistant to corrosion in almost all acids and alkalis except for aqua regia and ammonium salts. Expensive.	phosphoric acid, nitric acid, sulfuric acid, alkalis
	2-6	Tungsten carbide	WC alloy with Ni binder	Highly abrasion resistant and causes less slurry noise. Not applicable for corrosive fluids.	cement slurry, sand slurry, etc.
	2-7	Nickel	Mo: 15~17% Cr: 14.5~16.5% Fe: 4~7% Ni: remainder	Highly corrosion resistant against strong alkalis, especially against caustic soda and fluoric acid compared with other materials.	causic soda, fluoric acid, alkali fluids
	2-8	Zirconium	Zr: >99.2%	Corrosion resistant against various chemicals, especially against sulfides.	copper sulfide, formic acid, potassium hydroxide

Table 2 Process wetted material selection guide

A: applicable, B: applicable with some restriction, C: applicable only for grounding ring, D: not applicable, -: no information

No.	process fluid	chemical formula	concen-tration %	Lining				Electrode							
				1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
				polyure-thane rubber	ETFE	PFA	ceramic	SUS 316L	titanium	Hastelloy C-276	tantalum	platinum-iridium	tungsten carbide	nickel	zirco-nium
1	acetic acid	CH_3COOH	40	D	A	A	A	A	A	B (There must be no chloride)	A	A	-	D	A
			75	D	A	A	A	C	A	B (There must be no chloride)	A	A	-	D	A
2	alminum fluoride	AlF_3	20	-	A	A	-	D	D	C 25°C	D	A	-	C	D
3	alum	$KAl(SO_4)_2 \bullet 12H_2O$	10	-	-	A	-	C	-	C	A	A	-	-	-
4	aluminum chloride	$AlCl_3$	20	-	A	A	A	D	D	A	A	A	-	D	A
5	aluminum hydroxide	$Al(OH)_3$	10	-	A	A	-	C	A	C	A	A	-	A	A
6	aluminum nitrate	$Al(NO_3)_3$	10	-	A	A	-	B 75°C	A	C 25°C	B (oxide film may be generated)	A	-	-	-
7	aluminum sulfate	$Al(SO_4)_3 \bullet 18H_2O$	50	B 50°C	B 50°C	A	A	D	A	A	A	A	-	-	-
8	ammonium bicarbonate	NH_4HCO_3	50	-	A	A	-	A	-	C	A	A	-	-	-
9	ammonium bifluoride	NH_4FHF	5	-	A	A	-	D	D	C	D	A	-	-	-
10	ammonium carbonate	$(NH_4)_2 CO_3 \bullet H_2O$	50	-	A	A	A	C	-	C	A	A	-	-	-
11	ammonium chloride	NH_4Cl	25	B 50°C	A	A	A	D	A	A	A	A	-	C	A
			40	B 50°C	A	A	A	D	A	D	A	A	-	C	A
12	ammonium fluoride	NH_4F	10	-	A	A	-	C 25°C	B 30°C	A	D	A	-	D	-
			40	-	A	A	-	D	D	A	D	A	-	C 20%	-
13	ammonium hydroxide	NH_4OH	28	B 35°C	B 45°C	B 65°C	D	B 25°C C	B 80°C	B 25°C C	-	A	-	D	C
			30	B 50°C	B 90°C	A	A	B25°C C	A	B25°C C	D	A	-	D	C 30%
14	ammonium nitrate	NH_4NO_3	40	D	A	A	A	A	D	C	A	A	-	-	A

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A: applicable, B: applicable with some restriction, C: applicable only for grounding ring, D: not applicable, -: no information

No.	process fluid	chemical formula	concen-tration %	Lining				Electrode							
				1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
				polyure-thane rubber	ETFE	PFA	ceramic	SUS 316L	titanium	Hastelloy C-276	tantalum	platinum-iridium	tungsten carbide	nickel	zirco-nium
15	ammonium persulfate	$(NH_4)_2S_2O_8$	30	D	A	A	-	B 50°C C	-	D	A	A	-	-	-
16	ammonium persulfate	$(NH_4)_2S_2O_8$	50	D	A	A	-	B 50°C	-	D	A	A	-	-	-
17	ammonium phosphate	$(NH_4)_3PO_4$	10	-	A	A	-	D	A	D	A	A	-	C	A
18	ammonium sulfate	$(NH_4)_2SO_4$	20	B 50°C	A	A	A	C	A	C	A	A	-	C	-
			40	B	A	A	A	C	D	C	A	A	-	C	-
19	ammonium sulfide	$(NH_4)_2S$	40	-	-	A	-	C	-	C	A	A	-	-	-
20	antimony penta chlorate	$SbCl_5$	50	-	A	A	-	D	-	D	A	A	-	-	-
21	antimony trichlorate	$SbCl_3$	10	-	A	A	-	D	-	D	A	D	-	-	-
22	arsenic acid	H_3AsO_4	10	-	A	A	-	C	-	C	A	A	-	C	-
			30	-	A	A	-	C	-	D	A	A	-	-	-
23	arsenious acid	HAs_2O_3	10	-	A	A	-	C	-	C	A	A	-	-	-
24	barium sulfide	BaS	10	-	A	A	-	C 25°C	B 25°C	D	B 50°C	B 50°C	-	-	B 10°C
25	barium carbonate	$BaCO_3$	10	-	A	A	-	C	B 25°C	D	A	A	-	-	-
26	barium chloride	$BaCl_2$	25	B 50°C	A	A	A	D	B 50°C, 20%	C	A	A	-	C	B 20%
27	barium hydroxide	$Ba(OH)_2$	30	B 50°C	A	A	A	C	A	C	D	A	-	A	-
28	barium sulfate	$BaSO_4$	10	B 50°C	A	A	-	C	-	D	A	A	-	C 100%	-
29	bichloride of mercury	$HgCl_2$	40	-	A	A	-	D	A	C 75°C	A	A	-	-	-
30	boric acid	H_3BO_4	50	-	B 90°C	A	A	D	A	A	A	A	-	C 20%	A
31	cadmium chloride	$CdCl_2$	10	-	A	A	-	C	-	C 75°C	C 75°C	A	-	-	-
			30	-	A	A	-	C	-	C 25°C	C 25°C	A	-	-	-
32	calcium carbonate	$CaCO_3$	10	-	A	A	-	D	A	D	A	A	-	C	-
33	calcium chlorate	$Ca(ClO_3)_2$	30	-	-	A	A	C 1%	B 25°C	C	A	A	-	-	-
34	calcium chloride	$CaCl_2$	70	B 50°C	A	A	-	D	A	D	A	A	-	B 40%	B 60°C, 50%
35	calcium hydroxide	$Ca(OH)_2$	50	B 50°C	-	A	A	C	A	C	A	A	-	D	B 20%
36	calcium hypochlorite	$Ca(ClO)_2$	20	-	B 90°C	A	-	D	A	C	A	A	-	D	A
37	calcium nitrate	$Ca(NO_3)_2$	10	B 50°C	A	A	A	C	A	C	A	A	-	C	-
38	calcium sulfate	$CaSO_4$	10	B 50°C	A	A	A	A	B 50°C	D	A	A	-	-	-

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A: applicable, B: applicable with some restriction, C: applicable only for grounding ring, D: not applicable, -: no information

No.	process fluid	chemical formula	concen-tration %	Lining				Electrode							
				1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
				polyure-thane rubber	ETFE	PFA	ceramic	SUS 316L	titanium	Hastelloy C-276	tantalum	platinum-iridium	tungsten carbide	nickel	zirco-nium
39	caustic soda, sodium hydroxide	NaOH	40	B 35°C	A	A	D	B	A	C	D	A	-	A	C
			50	B 35°C	A	A	D	B 80°C	C	C	D	A	-	A	C
40	chlorine dioxide	Cl_2O_2	15	-	A	A	-	D	A	C	A	A	-	-	-
41	chloroacetic acid	$C_2H_3ClO_2$	60	-	A	A	-	D	C	C	A	A	-	-	-
42	chlorosulfonic acid	HSO_3Cl	10	D	B 20°C	B 90°C	-	D	D	C 25°C	A	A	-	-	-
			45	D	B 80°C	B 90°C	-	D	D	B 25°C	A	A	-	-	-
43	chromic acid	H_2CrO_4	50	-	C	A	D	D	A	C	B (oxide film may be generated)	A	-	D	B 30%
44	chromium sulfate	$CrSO_4$	20	D	-	A	-	D	-	C	A	A	-	-	-
45	citric acid	$C_6H_8O_7$		-	B 50°C	A	-	A	-	-	-	-	-	-	-
46	copper chloride	CuCl	40	-	-	A	-	D	C	C 50°C	A	D	-	-	-
47	copper chloride	$CuCl_2$	40	B 50°C	-	A	A	D	C	C 25°C	A	D	-	-	-
48	copper cyanide	$Cu(CN)_2$	10	B 50°C	A	A	-	A	-	C	A	A	-	-	-
49	copper nitrate	$Cu(NO_3)_2$	10	-	A	A	-	A	B 25°C	C 25°C	A	A	-	-	-
			50	-	A	A	-	C	B 25°C	C 25°C	A	A	-	-	-
50	copper sulfate	$CuSO_4$	30	-	A	A	A	D	C	A	A	B 50°C	-	C 10°C	-
51	ferric chloride	$FeCl_3$	10	-	A	A	A	D	A	B 50°C	A	B 25°C	-	D	A
			30	-	A	A	A	D	A	C	A	B 25°C	-	-	A
			50	-	A	A	A	D	A	D	A	B 25°C	-	-	A
52	ferric nitrate	$Fe(NO_3)_3$	10	-	A	A	A	C	-	B 25°C	A	A	-	-	-
			50	-	A	A	A	C	-	C 25°C	A	A	-	-	-
53	ferric sulfate	$Fe_2(SO_4)_3$	10	-	A	A	A	A	B 25°C	B 50°C C 75°C	A	A	-	D	A
			30	-	A	A	A	D	B 25°C	B 50°C C 75°C	A	A	-	-	A
54	ferrous sulfate	$FeSO_4$	50	-	A	A	A	D	A	C	A	A	-	-	-

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No.	process fluid	chemical formula	concen-tration %	Lining				Electrode							
				1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
				polyure-thane rubber	ETFE	PFA	ceramic	SUS 316L	titanium	Hastelloy C-276	tantalum	platinum-iridium	tungsten carbide	nickel	zirco-nium
55	ferrous chloride	$FeCl_2$	50	B 50°C	A	A	A	D	A	C	A	A	-	D	D
56	fluoroboric acid	HBF_4	20	-	-	B 90°C	-	D	D	D	D	A	-	-	-
57	fluorosilicate	H_2SiF_6	10	-	B 90°C	B 90°C	-	D	D	D	D	A	-	-	-
58	formaldehyde	CH_2O	40	-	A	A	A	A	A	C	A	A	-	-	-
59	formic acid	HCOOH	10	D	A	A	A	D	D	B 50°C C	A	A	-	C	A
			50	D	A	A	A	D	D	B 50°C C	A	A	-	C	A
60	hydrobromic acid	HBr	48	D	B 70°C	A	A	D	A	D	A	A	-	-	-
61	hydro-chloric acid	HCl	10	-	A	A	A	D	B 25°C	B 25°C	A	D	-	D	A
			35	-	B 70°C	A	A	D	D	C 25°C	A	D	-	D	B 30%
62	hydrocyanic	CHN		-	A	B 93°C	-	D	D	D	B 93°C	B	-	-	-
63	hydrofluoric acid	HF	20	D	A	A	D	D	D	C	D	A	-	D	-
64	hydrofluosi-licic acid	H_2SiF_6	35	-	A	A	-	D	D	D	D	A	-	-	-
65	hydrogen peroxide	H_2O_2	30	D	B 45°C	B 65°C	-	B 25°C	D	B 25°C	A	D	-	C 60°C, 20%	A
66	hydrogen sulfide	H_2S	10	-	A	A	A	D	-	D	A	A	-	-	-
67	hypochlorous acid	HClO	20	-	A	A	-	D	D	A	A	D	-	-	-
68	iodine	I	10	-	A	A	-	D	D	C	A	A	-	-	-
69	lead acetate	$Pb(CH_3CO_2)_2$	40	D	A	A	-	C	B 25°C	D	A	D	-	-	-
70	lithium bromide	LiBr	60	-	-	A	-	D	-	-	A	A	-	-	-
71	lithium chloride	LiCl	60	-	B 52°C	A	-	D	A	A	A	A	-	-	-
72	magnesium carbonate	$MgCO_3$	10	-	A	A	-	C	C	C	A	A	-	-	-
73	magnesium chloride	$MgCl_2$	40	B 50°C	-	A	A	D	A	A	A	A	-	-	-
74	magnesium hydroxide	$Mg(OH)_2$	10	B 50°C	A	A	-	C	-	C 25°C	D	A	-	-	-
75	magnesium nitrate	$Mg(NO_3)_2$	10	-	A	A	-	C	C	C	A	A	-	-	-
76	magnesium sulfate	$MgSO_4$	40	-	A	A	A	A	A	D	A	A	-	C 30%	-
77	nickel chloride	$NiCl_2$	20	-	A	A	A	D	A	-	A	A	-	B 100%	B 100%
78	nickel nitrate	$Ni(NO_3)_2$	10	-	A	A	-	C	-	C 25°C	A	A	-	D	-
			50	-	A	A	-	C 25°C	-	D	A	A	-	D	-
79	nickel sulfate	$NiSO_4$	10	B 50°C	A	A	A	C	-	C	A	A	-	A 100%	A 100%

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				1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
				polyure-thane rubber	ETFE	PFA	ceramic	SUS 316L	titanium	Hastelloy C-276	tantalum	platinum-iridium	tungsten carbide	nickel	zirco-nium
80	nitric acid	HNO_3	10	D	B 50°C	A	A	A	A	B 50°C	B (oxide film may be generated)	A	-	D	-
			40	D	-	A	A	B 25°C	A	B 50°C	B (oxide film may be generated)	A	-	D	-
			70	D	-	B 90°C	A	D	C	D	B (oxide film may be generated)	A	-	D	-
81	nitrohydro-chloric acid	$1HNO_3$ + 3HCl		D	A	A	A	D	B 25°C	D	A	D	-	D	D
82	oxalic acid	$C_2H_2O_4$ •$2H_2O$	45	-	A	A	-	D	D	C	A	A	-	D	-
83	perchloric acid	$HClO_4$	70	-	B 40°C	A	-	D	-	-	A	A	-	D	-
84	phenol/ carbolic acid	C_6H_6O	10	-	A	A	-	C	-	A	A	A	-	-	-
85	phosphoric acid	H_3PO_4	50	B 50°C	A	A	D	D	D	D	B (There must be no HF.)	A	-	D	C
			85	B 50°C	A	A	D	D	D	D	B (There must be no HF.)	A	-	D	D
86	potassium alum	$KAl(SO_4)_3$ •$18H_2O$	10	-	-	A	A	C	-	C	A	A	-	-	-
87	potassium bicarbonate	$NaHCO_3$	20	-	A	A	A	A	A	A	A	A	-	A	A
88	potassium bicarbonate	$KHCO_3$	30	-	A	A	-	A	A	C	A	A	-	-	-
			50	-	A	A	-	C	A	C	A	A	-	-	-
89	potassium carbonate	K_2CO_3	20	-	A	A	-	C	A	C	D	A	-	C	-
			60	-	A	A	-	C	C	C	D	A	-	C	-
90	potassium chloride	KCl	10	B 50°C	A	A	A	D	A	B 25°C C	B 25°C C	A	-	C	A
			40	B 50°C	A	A	A	D	A	C	C	A	-	C 30%	B 30%
91	potassium ferricyanide	$K_3[Fe(CN)_6]$	30	-	A	A	-	C	A	C	A	D	-	-	-
92	potassium ferrocyanide	$K_4[Fe(CN)_6]$	30	A	-	-	C	A	C	A	D	-	-	-	-
93	potassium hydroxide	KOH	10	B 35°C	B 80°C	B 90°C	D	D	A	C	A	A	-	A	A
			45	B 35°C	-	B 90°C	D	D	D	C	D	A	-	A	A
94	potassium nitrate	KNO_3	40	B 50°C	A	A	A	C	A	C	A	A	-	C	-

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				1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
				polyure-thane rubber	ETFE	PFA	ceramic	SUS 316L	titanium	Hastelloy C-276	tantalum	platinum-iridium	tungsten carbide	nickel	zirco-nium
95	potassium permanganate	$KMnO_4$	30	D	B 80°C	B 90°C	-	C	-	C	A	A	-	-	-
96	potassium persulfate	$K_2S_2O_8$	10	-	A	A	-	A	B 75°C	B 50°C	A	A	-	-	-
97	potassium sulfate	K_2SO_4	20	B 50°C	A	A	A	A	A	A	A	A	-	C	A
98	sea water			B 50°C	A	A	-	D	A	C	A	A	D	-	-
99	sewage			B 50°C	A	A	-	A	A	A	A	A	A	-	-
100	silver nitrate	$AgNO_3$	20	B 50°C	A	A	-	B 25°C C	B 50°C	B 25°C	A	A	-	D	-
			50	B 50°C	A	A	-	B 25°C C	-	B 25°C	A	A	-	D	-
101	sodium acetate	$NaCH_3CO_2$	100	D	A	A	-	B 10%	A	A	A	A	-	A	A
102	sodium bisulfate	$NaHSO_4$	20	-	A	A	A	D	B 25°C	C 50°C	A	A	-	-	-
103	sodium bisulfite	$NaHSO_3$	40	-	A	A	A	D	C	C	A	A	-	-	-
104	sodium bromide	NaBr	50	-	A	A	-	C	D	C	A	A	-	C	-
105	sodium carbonate	Na_2CO_3	10	-	A	A	A	D	A	A	A	A	-	A	-
106	sodium carbonate	Na_2CO_3	30	-	A	A	-	D	A	C	A	A	-	A	-
107	sodium chlorate	$NaClO_2$	10	-	A	A	A	C 25°C	A	D	A	A	-	-	-
			30	-	A	A	A	C 25°C	A	D	A	A	-	-	-
			40	-	A	A	A	C 25°C	D	D	A	A	-	-	-
108	sodium chlorate	$NaClO_3$	40	-	A	A	A	D	B 25°C	C	A	A	-	-	-
109	sodium chloride	NaCl	25	B 50°C	A	A	A	D	A	D	A	A	-	D	A
110	sodium chromate	Na_2CrO_4	60	-	C	A	-	A	A	A	B (oxide film may be generated)	A	-	A	A
111	sodium cyanide	NaCN	10	-	A	A	-	A	A	-	A	A	-	C 40°C	A
			20	-	A	A	-	-	A	-	A	A	-	-	A
112	sodium ferricyanide	$Na_3[Fe(CN)_6]$	10	-	A	A	C 50°C	-	C 25°C	-	A	D	-	-	-
113	sodium ferrocyanide	$Na[Fe(CN)_6]$	10	-	-	A	-	C	-	C	A	D	-	-	-
114	sodium hydrosulfide	NaSH	10	-	A	A	-	A	-	B 25°C	A	A	-	-	-
			40	-	A	A	-	A	-	-	A	A	-	-	-

Table 2 Process wetted material selection guide

A: applicable, B: applicable with some restriction, C: applicable only for grounding ring, D: not applicable, -: no information

No.	process fluid	chemical formula	concen-tration %	Lining				Electrode							
				1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
				polyure-thane rubber	ETFE	PFA	ceramic	SUS 316L	titanium	Hastelloy C-276	tantalum	platinum-iridium	tungsten carbide	nickel	zirco-nium
115	sodium hydroxide	NaOH	40	B 35°C	A	A	D	B (oxide film may be generated)	A (oxide film may be generated)	C	D	A	-	A	C
			50	B 35°C	A	A	D	B 80°C	C	C	D	A	-	A	C
116	sodium hypochlorite	NaOCl	15	D	B 70°C	A	A	D	A	A	A	A	-	D	B 10°C
			20	D	-	B 90°C	-	D	A	B 50°C	A	A	-	D	-
117	sodium nitrate	$NaNO_3$	30	-	A	A	A	D	A	B 25°C	A	A	-	A	-
			50	-	A	A	A	D	A	D	A	A	-	A	-
118	sodium nitrate	$NaNO_2$	60	-	A	A	A	A	A	A	A	A	-	-	-
119	sodium phosphate	Na_2HPO_4	50	-	A	A	-	D	A	A	C 25°C	A	-	-	-
120	sodium silicate	Na_2SiO_3	10	-	A	A	-	A	A	C	A	A	-	-	-
121	sodium sulfate	Na_2SO_4	10	B 50°C	A	A	A	A	C	C	A	A	-	C	A
			30	B 50°C	A	A	A	C	C	C	A	A	-	C	A
122	sodium sulfide	Na_2S	10	-	A	A	A	B 75°C C	A	C	A	A	-	-	-
			50	-	A	A	A	D	D	C	A	A	-	-	-
123	sodium sulfite	Na_2SO_3	30	-	A	A	A	B 75°C C 100°C	A	C	A	A	-	-	-
124	sodium thiosulfate	$Na_2S_2O_3$	60	B 50°C	A	A	A	A	-	C	A	A	-	-	-
125	soy sauce			-	A	A	-	D	A	D	A	A	-	-	-
126	sulfuric acid	H_2SO_4	50	B 35°C	A	A	A	D	D	D	C	A	-	C 10°C, 40%	C
			80	D	A	A	A	D	D	D	C	A	-	D	C 70%
			96	D	A	A	A	D	D	D	C	A	-	D	D
127	sulfurous acid	H_2SO_3	10	B 35°C	A	A	A	D	B 30°C	C	A	A	-	-	-
128	tin chloride	$SnCl_2$	10	-	-	A	A	A	D	D	A	A	-	-	-
			30	-	-	A	A	D	D	D	A	A	-	-	-
129	tin chloride	$SnCl_4$	20	-	-	A	A	D	C	C	A	A	-	-	-
			50	-	-	A	A	D	D	C	A	A	-	-	-
130	uric acid	CH_4N_2O	50	-	-	A	-	C	B (There must be no chloride)	-	A	A	-	-	-
131	water	H_2O		B 50°C	A	A	A	A	A	A	A	A	A	A	A

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No.	process fluid	chemical formula	concen-tration %	Lining				Electrode							
				1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8
				polyure-thane rubber	ETFE	PFA	ceramic	SUS 316L	titanium	Hastelloy C-276	tantalum	platinum-iridium	tungsten carbide	nickel	zirco-nium
132	yellow prussiate, potassium ferrocyanide	$K_4[Fe(CN)_6]$	30	-	A	A	A	-	C	A	C	A	A	A	-
133	zinc chloride	$ZnCl_2$	20	-	A	A	A	D	A	A	C	A	-	-	-
			50	-	A	A	A	D	A	A	D	A	-	-	-
134	zinc sulfate	$ZnSO_4$	40	-	A	A	-	D	A	C	A	A	-	-	-

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