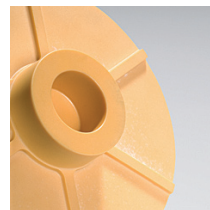
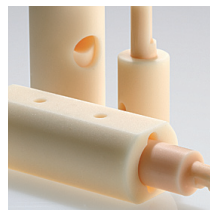
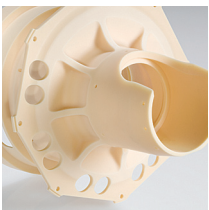


**FRIALIT®-DEGUSSIT® Oxide Ceramics**  
**Corrosion resistance**



# FRIALIT®-DEGUSSIT® OXIDE CERAMIC MATERIALS

## FRIALIT® F99,7

Pure  $Al_2O_3$ ; dense, extremely resistant to wear and corrosion, very high electrical insulating properties

## DEGUSSIT® AL23

Pure  $Al_2O_3$ ; dense, excellent thermal and electrical properties, corrosion resistant

## FRIALIT® FZT

$Al_2O_3$  doped with  $ZrO_2$ ; dense, high strength, good resistance to thermal shock, extremely resistant to wear and corrosion, fine grain size

## FRIALIT® FZM

$ZrO_2$  partially stabilized with MgO; dense, high strength and wear resistance, extremely resistant to corrosion and thermal shock

The following table shows the corrosion properties of oxide ceramics and other special materials. These data are based on chemical conditions as far as we know them.

To a large extent the corrosion resistance data of the different materials result from laboratory tests. Generally, however, corrosive conditions in practical operation are essentially more differentiated. The smallest portions of an intermediate product appearing only for short time may finally determine corrosive attacks.

In cases where particular applications cannot be based on reliable experiences, the corrosion resistance of our materials is to be determined by test specimens under process conditions.

## ABBREVIATIONS:

A	resistant
B	weak reaction
C	strong reaction
rt	room temperature
s	boiling
conc.	concentrated
sat.	saturated

Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon
				F99,7 AL23	FZM	FZT								
Acetaldehyde	CH <sub>3</sub> CHO		rt	A	A	A	A	A	C	C	C	B	B	C
Acetic acid	CH <sub>3</sub> COOH	5	rt	A	A	A	A	A	C	C	A	B	B	B
		5	b	A	A	A	A	A	C	C	A	B	B	B
		10	rt	A	A	A	A	A	C	C	A	B	B	B
		10	b	A	A	A	A	A	C	C	A	B	B	B
		50	rt	A	A	A	A	A	C	C	A	B	B	B
		50	b	A	A	A	A	A	C		A	B	B	B
		80	rt	A	A	A	A	A	C	C	A	B	B	B
		80	b	A	A	A	A	A	C	C	A	B	B	B
		conc.	rt	A	A	A	A	A	C	C	A	B	B	B
		conc.	b	A	A	A	A	A	C	C	A	B	B	B
Acetic acid anhydride	(CH <sub>3</sub> CO) <sub>2</sub> O		rt	A	A	A	A	A	C	C	A	B	B	B
Acetone	CH <sub>3</sub> CHOCH <sub>3</sub>	100	rt	A	A	A	A	A	C	C	B	B	A	C
Alum	K <sub>2</sub> Al <sub>2</sub> (SO <sub>4</sub> ) <sub>4</sub>	10	rt	A	A	A	A	A	A	B	A	A	A	A
Aluminiumchloride	AlCl <sub>3</sub>	10	rt	A	A	A	A	A	A	B	A	B	A	A
		10	100	A	A	A	A	A	A	B	A	B	A	A
		25	60	A	A	A	A	A	A	B	A	B	A	A
		25	100	A	A	A	A	A	A	B	A	B	A	A
Aluminiumsulfate	Al <sub>2</sub> (SO <sub>4</sub> ) <sub>3</sub>	80	b	A	A	A	A	A	A	B	A	B	A	A
		10	rt	A	A	A	A	A	A	B	A	A	A	A
		10	b	A	A	A	A	A	A	B	A	A	A	A
		15	50	A	A	A	A	A	A	B	A	A	A	A
		20	55	A	A	A	A	A	A	B	A	A	A	A
		25	b	A	A	A	A	A	A	B	A	A	A	A
		50	b	A	A	A	A	A	A	B	A	A	A	A
		55	40	A	A	A	A	A	A	B	A	A	A	A
		57	120	A	A	A	A	A	A	B	A	A	A	A
Ammonia, Ammoniumhydroxide	NH <sub>3</sub> NH <sub>4</sub> OH	10	rt	A	A	A	A	A	B	B	A	A	A	A
		10	b	A	A	A	A	A	B	B	A	A	A	A
		20	b	A	A	A	A	A	B	B	A	A	A	A
		25	b	A	A	A	A	A	B	B	A	A	A	A
		conc.	rt	A	A	A	A	A	B	B	A	A	A	A
		conc.	100	A	A	A	A	A	B	B	A	A	A	A
Ammoniumbromide	NH <sub>4</sub> Br	10	25	A	A	A	A	A	A	A	A	A	A	A
Ammoniumcarbonate	(NH <sub>4</sub> ) <sub>2</sub> CO <sub>3</sub>	10-20	b	A	A	A	A	A	A	B	A	A	A	A
		30	80	A	A	A	A	A	A	B	A	A	A	A
		30	b	A	A	A	A	A	A	B	A	A	A	A
		40	b	A	A	A	A	A	A	B	A	A	A	A
		50	b	A	A	A	A	A	A	B	A	A	A	A
		sat.	rt	A	A	A	A	A	A	B	A	A	A	A
		sat.	b	A	A	A	A	A	A	B	A	A	A	A
Ammoniumchloride	NH <sub>4</sub> Cl	10	rt	A	A	A	A	A	A	A	A	A	A	A
		10	b	A	A	A	A	A	A	A	A	A	A	A
		25	rt	A	A	A	A	A	A	A	A	A	A	A

Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon
				F99,7 AL23	FZM	FZT								
		25	b	A	A	A	A	A	A	A	A	A	A	A
		50	rt	A	A	A	A	A	A	A	A	A	A	A
Ammoniumchloride	NH <sub>4</sub> Cl	50	b	A	A	A	A	A	A	A	A	A	A	A
		sat.	rt	A	A	A	A	A	A	A	B	A	A	A
		sat.	b	A	A	A	A	A	A	A	B	A	A	A
Ammoniumfluoride	NH <sub>4</sub> F	20	80				A					A	A	
Ammoniumhydroxide	NH <sub>4</sub> OH	28	20-60	A	A	A	A	A	B	B	A	A	A	A
Ammoniumnitrate	NH <sub>4</sub> NO <sub>3</sub>	10	rt	A	A	A		A	A	B	A	A	A	A
		20	rt	A	A	A		A	A	B	A	A	A	A
		20	rt	A	A	A		A	A	B	A	A	A	A
		50	rt	A	A	A		A	A	B	A	A	A	A
		50	b	A	A	A		A	A	B	A	A	A	A
Ammoniumsulfate	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>	all	rt	A	A	A	A	A	A	B	A	A	A	A
		all	b	A	A	A	A	A	A	B	A	A	A	A
Aniline	C <sub>6</sub> H <sub>5</sub> NH <sub>2</sub>		rt	A	A	A	A	A	A	C	C	B	A	C
			b	A	A	A	A	A	A	C	C	B	A	C
Aqua regia	HCl:HNO <sub>3</sub>	3:1	rt	A	A	A	A	A	B	C	C	C	C	B
Arsenic acid	H <sub>3</sub> AsO <sub>3</sub>		rt	A	A	A	A	A	A	B	A	A	A	A
Bariumchloride	BaCl <sub>2</sub>	20	rt	A	A	A	A	A	A	A	A	A	A	A
		20	100	A	A	A	A	A	A	A	A	A	A	A
Bariumhydroxide	Ba(OH) <sub>2</sub>	sat.	rt	A	A	A	A	A			A	A		
		sat.	b	A	A	A	A	A						
Benzenesulfonic acid	C <sub>6</sub> H <sub>5</sub> SO <sub>3</sub> H		70	A	A	A	A	A				A		
Benzoic acid	C <sub>6</sub> H <sub>5</sub> COOH	all	rt	A	A	A	A	A				A		
Benzol, Benzene	C <sub>6</sub> H <sub>6</sub>		rt	A	A	A	A	A	A	C	C	C	C	C
Boric acid	H <sub>3</sub> BO <sub>3</sub>	10	b	A	A	A	A	A	A	B	A	A	A	A
		50	b	A	A	A	A	A	A	B	A	A	A	A
Bromide	Br	dry	rt	A	A	A	C	A	B	C	C	C	C	B
			b	A	A	A	C	A	B	C	C	C	C	B
Butylacetate	C <sub>6</sub> H <sub>12</sub> O <sub>2</sub>		rt	A	A	A	A	A	C	C	C	C	B	C
Butylalcohol	C <sub>4</sub> H <sub>9</sub> OH		rt	A	A	A	A	A	A	B	A	A	A	B
			b	A	A	A	A	A	A	B	A	A	A	B
Butyric acid	C <sub>3</sub> H <sub>7</sub> COOH	100	rt	A	A	A	A	A			A	A		
		100	b	A	A	A	A	A			A	A		
Calcium bisulfite	Ca(HSO <sub>3</sub> ) <sub>2</sub>		rt	A	A	A	A	A	A	C	B	B	A	A
Calciumhypochlorite	CaCl <sub>2</sub> O <sub>2</sub>	20	40	A	A	A	A	A	A	C	B	C	C	A
Calciumnitrate	Ca(NO <sub>3</sub> ) <sub>2</sub>		rt	A	A	A	A	A	A	B	A	A	A	A
Calciumsulfate	CaSO <sub>4</sub>	1-5	rt	A	A	A	A	A	A	B	A	A	A	A
		10	b	A	A	A	A	A	A	B	A	A	A	A
Carbon disulfide	CS <sub>2</sub>		rt	A	A	A	A	A	A	C	C	C	C	C
			b	A	A	A	A	A	A	C	C	C	C	C
Carbon tetrachloride	CCl <sub>4</sub>		rt	A	A	A	A	A	B	C	C	C	C	C
Carnallite	MgCl <sub>2</sub> KCl <sub>6</sub> H <sub>2</sub> O		90	A	A	A	A	A	A	B	A	A	A	A
Chloral Chloride	CCl <sub>3</sub> CHO		50	A	A	A	A	A						
	Cl <sub>2</sub>	dry	rt	A	A	A	A	A	A	C	C	C	B	B

Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon
				F99,7 AL23	FZM	FZT								
			70	A	A	A	C	A	A	C	C	C	B	B
Chloride	Cl <sub>2</sub> + H <sub>2</sub> O > 0,6 %	moist	rt	A	A	A	A	A	A	C	C	C	C	B
			100	A	A	A	C	A	A	C	C	C	C	B
Chloroacetic acid	CH <sub>2</sub> ClCOOH	50	20	A	A	A	A	A	C	C	C	C	B	B
			70	A	A	A	A	A	C	C	C	C	B	B
Chloroacetic acid	CH <sub>2</sub> ClCOOH	100	rt	A	A	A	A	A	C	C	C	C	B	B
			100	b	A	A	A	A	C	C	C	C	B	B
Chlorobenzene	C <sub>6</sub> H <sub>5</sub> Cl		20	A	A	A	A	A	B	C	C	C	C	C
Chlorosulfonic acid	SO <sub>2</sub> (OH)Cl		rt	A	A	A	A	A	C	C	C	C	C	C
			b	A	A	A	C	A	C	C	C	C	C	C
Chromium acid	H <sub>2</sub> CrO <sub>4</sub>	10	rt	A	A	A	A	A	A	C	C	C	C	B
			10	b	A	A	A	C	A	A	C	C	C	B
			50	rt	A	A	A	C	A	A	C	C	C	B
			50	b	A	A	A	C	A	A	C	C	C	B
Citric acid	C <sub>6</sub> H <sub>8</sub> O <sub>7</sub>	5	rt	A	A	A	A	A	A	B	A	A	A	A
			5	b	A	A	A	A	A	B	A	A	A	A
			25	rt	A	A	A	A	A	B	A	A	A	A
			25	b	A	A	A	A	A	B	A	A	A	A
			50	rt	A	A	A	A	A	B	A	A	A	A
			50	b	A	A	A	A	A	B	A	A	A	A
Copper sulfate	CuSO <sub>4</sub>	5	rt	A	A	A	A	A	A	A	A	A	A	A
			5	b	A	A	A	A	A	A	A	A	A	A
			25	b	A	A	A	A	A	A	A	A	A	A
			50	b	A	A	A	A	A	A	A	A	A	A
			all	b	A	A	A	A	A	A	A	A	A	A
Copper-(II)-chloride	CuCl <sub>2</sub> · 2H <sub>2</sub> O	20	rt	A	A	A	A	A	A	A	A	A	A	A
			20	b	A	A	A	A	A	A	A	A	A	A
			40	b	A	A	A	A	A	A	A	A	A	A
			50	rt	A	A	A	A	A	A	A	A	A	A
			sat.	b	A	A	A	A	A	A	A	A	A	A
Dichloro ethane	C <sub>2</sub> H <sub>4</sub> Cl <sub>2</sub>	100	50	A	A	A	A	A		C		C		
Dichloro ethylene	C <sub>2</sub> H <sub>2</sub> Cl <sub>2</sub>		b	A	A	A	A	A				C		
Dioxane	O <sub>2</sub> (CH <sub>2</sub> ) <sub>4</sub>			A	A	A	A	A		C	C	C	C	
Diphenyl	C <sub>6</sub> H <sub>5</sub> C <sub>6</sub> H <sub>5</sub>			A	A	A	A	A	C	C	C	C	C	
Ether	(C <sub>2</sub> H <sub>5</sub> ) <sub>2</sub> O		rt	A	A	A	A	A	C	C	C	C	C	C
Ethylacetate	CH <sub>3</sub> COOC <sub>2</sub> H <sub>5</sub>		rt	A	A	A	A	A	C	C	C	C	B	C
Ethylalcohol, Ethanol	C <sub>2</sub> H <sub>5</sub> OH		rt	A	A	A	A	A	A	B	A	A	A	A
Ethylchloride	C <sub>2</sub> H <sub>5</sub> Cl		rt	A	A	A	A	A	B	C	C	C	C	C
Ferric nitrate	Fe(NO <sub>3</sub> ) <sub>3</sub>	all	rt	A	A	A	A	A	A	B	A	A	A	A
Ferric-(II)-Chloride	FeCl <sub>2</sub>	30	100	A	A	A	A	A	A	B	A	B	A	A
			10	b	A	A	A	A	A	B	A	B	A	A
			30	rt	A	A	A	A	A	B	A	B	A	A
			50	50	A	A	A	A	A	B	A	B	A	A
			sat.	100	A	A	A	A	A	B	A	B	A	A
Ferric-(II)-Sulfate	FeSO <sub>4</sub> · H <sub>2</sub> O	10	rt	A	A	A	A	A	A	B	A	B	A	A

Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon
				F99,7 AL23	FZM	FZT								
		all	b	A	A	A	A	A	A	B	A	B	A	A
Ferric-(III)-Chloride	FeCl <sub>3</sub>	5	25	A	A	A	A	A	A	B	A	B	A	A
		10	65	A	A	A	A	A	A	B	A	B	A	A
		15	25	A	A	A	A	A	A	B	A	B	A	A
		45	25	A	A	A	A	A	A	B	A	B	A	A
		50	50	A	A	A	A	A	A	B	A	B	A	A
		50	b	A	A	A	A	A	A	B	A	B	A	A
Ferric-(III)-Sulfate	Fe(SO <sub>4</sub> ) <sub>3</sub>		rt	A	A	A	A	A	A	B	A	B	A	A
		til 30	til 65	A	A	A	A	A	A	B	A	B	A	A
Flourosilic acid	H <sub>2</sub> SiF <sub>6</sub>		rt	A	B	A	A	A			A	A		
		30	30	A	C	A	A	A			A	A		
Formaldehyde	CH <sub>2</sub> O	all	til b	A	A	A	A	A	A	B	A	A	A	A
Formic acid	HCOOH	10	rt	A	A	A	A	A	A	B	C	B	B	A
		10	65	A	A	A	A	A	A	B	C	B	B	A
		10	b	A	A	A	A	A	A	B	C	B	B	A
		20-40	65	A	A	A	A	A	A	B	C	B	B	A
		50	rt	A	A	A	A	A	A	B	C	B	B	A
		50	b	A	A	A	A	A	A	B	C	B	B	A
		60	65	A	A	A	A	A	A	B	C	B	B	A
		80	rt	A	A	A	A	A	A	B	C	B	B	A
		80	65	A	A	A	A	A	A	B	C	B	B	A
		80	b	A	A	A	A	A	A	B	C	B	B	A
		90	100	A	A	A	A	A	A	B	C	B	B	A
		conc.	rt	A	A	A	A	A	A	B	C	B	B	A
		conc.	b	A	A	A	A	A	A	B	C	B	B	A
Fuming sulfuric acid	H <sub>2</sub> S <sub>2</sub> O <sub>7</sub>	10	rt	A	A	A	C	A	A	C	C	C	C	B
		10	b	A	A	A	C	A	A	C	C	C	C	B
		25	rt	A	A	A	C	A	A	C	C	C	C	B
		25	b	A	A	A	C	A	A	C	C	C	C	B
Furfuryl alcohol	C <sub>5</sub> H <sub>4</sub> O <sub>2</sub>	25	b	A	A	A	A	A	C	C	C	A	A	A
		100	rt	A	A	A	A	A	C	C	C	A	A	A
		100	b	A	A	A	A	A	C	C	C	A	A	A
Glycerine	CH <sub>2</sub> OHCHOH		rt	A	A	A	A	A	A	A	A	A	A	A
	CH <sub>2</sub> OH		b	A	A	A	A	A	A	A	A	A	A	A
Hydrochloric acid	HCl	0,5	rt	A	A	A	A	A	A	C	B	B	B	A
		0,5	b	A	A	A	A	A	A	B	C	C	C	B
		5	rt	A	A	A	A	A	A	C	B	B	B	A
		5	60	A	A	A	A	A	A	C	B	B	B	A
		5	b	A	A	A	A	A	A	B	C	C	C	B
		10	rt	A	A	A	A	A	A	C	B	B	B	A
		10	50	A	A	A	A	A	A	C	B	B	B	A
		10	b	A	A	A	A	A	A	B	C	C	C	B
		15	rt	A	A	A	A	A	A	C	B	B	B	A
		15	b	A	A	A	A	A	A	B	C	C	C	B
		20	rt	A	A	A	A	A	A	C	B	B	B	A

Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon
				F99,7 AL23	FZM	FZT								
		20	b	A	A	A	A	A	B	C	C	C	C	B
		30	rt	A	A	A	A	A	A	C	B	B	B	A
		30	b	A	A	A	A	A	B	C	C	C	C	B
		37	rt	A	A	A	A	A	A	C	B	B	B	A
		37	b	A	A	A	A	A	B	C	C	C	C	B
Hydrochloric acid + Nitric acid	HCl:HNO <sub>3</sub>	3:1	rt	A	A	A	A	A	B	C	C	C	C	B
Hydrogen bromide	HBr		rt	A	A	A	A	A	A	C	B	C	A	A
Hydrogen bromide acid	HBr	0-50	b	A	A	A	A	A	A	C	B	C	A	A
Hydrogen cyanide	HCN		rt	A	A	A	A	A	A	B	B	B	B	A
Hydrogen flouride	HF	1	rt	A	C	A	A	A	A	C	B	B	B	A
		40	rt	A	C	A	A	A	A	C	B	B	B	A
		40	50	A	C	A	A	A	A	C	C	C	C	B
		50	rt	A	C	A	A	A	A	C	B	B	B	A
		100	rt	A	C	A	C	A	A	C	C	C	C	A
		100	b	B	C	B	C	A	A	C	C	C	C	B
Hydrogen sulfide	H <sub>2</sub> S		rt	A	A	A	A	A	A	C	B	C	A	A
			100	A	A	A	A	A	A	C	C	C	A	A
Lactic acid	H <sub>6</sub> C <sub>3</sub> O <sub>3</sub>	1,5	rt	A	A	A	A	A	B	B	B	C	B	B
		1,5	b	A	A	A	A	A	B	B	B	C	B	B
		10	rt	A	A	A	A	A	B	B	B	C	B	B
		10	b	A	A	A	A	A	B	B	B	C	B	B
		conc.	b	A	A	A	A	A	B	B	B	C	B	B
Lead acetate	C <sub>4</sub> H <sub>6</sub> O <sub>4</sub> Pb	all	rt	A	A	A	A	A	A	A	A	A	A	A
Magnesium chloride	MgCl <sub>2</sub>	10	rt	A	A	A	A	A	A	B	A	A	A	A
		20	b	A	A	A	A	A	A	B	A	A	A	A
		30	rt	A	A	A	A	A	A	B	A	A	A	A
		42	b	A	A	A	A	A	A	B	A	A	A	A
Magnesium sulfate	MgSO <sub>4</sub>	10	rt	A	A	A	A	A	A	B	A	A	A	A
		25		A	A	A	A	A	A	B	A	A	A	A
		50		A	A	A	A	A	A	B	A	A	A	A
		sat.		A	A	A	A	A	A	B	A	A	A	A
Maleic acid	C <sub>4</sub> H <sub>4</sub> O <sub>4</sub>	10	til 80	A	A	A	A	A	C	C	A	B	B	A
		10	b	A	A	A	A	A	C	C	A	B	B	A
		50	100	A	A	A	A	A	C	C	A	B	B	A
Malic acid	C <sub>4</sub> H <sub>6</sub> O <sub>5</sub>	til 50	rt	A	A	A	A	A	A	A	A	A	A	A
			b	A	A	A	A	A	A	A	A	A	A	A
Manganese chloride	MnCl <sub>2</sub>	5	100	A	A	A	A	A	A		A	A		
		20	100	A	A	A	A	A	A		A	A		
		50	100	A	A	A	A	A	A		A	A		
Manganese sulfate	MnSO <sub>4</sub>	all	rt	A	A	A	A	A	A		A	A		
Mercury	Hg		20	A	A	A	A	A	A	A	A	A	A	A
			50	A	A	A	A	A	A	A	A	A	A	A
			b	A	A	A	C							
Methanol	CH <sub>3</sub> OH	all	rt	A	A	A	A	A	C	B	A	A	A	A

Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon
				F99,7 AL23	FZM	FZT								
		all	b	A	A	A	A	A	C	B	A	A	A	A
Methylene chloride	CH <sub>2</sub> Cl <sub>2</sub>		rt - b	A	A	A	A	A	A	B	C	C	C	C
Monochloro acetic acid	CH <sub>2</sub> ClCO <sub>2</sub> H	50	rt	A	A	A	A	A	A	C	C	C	C	B
		70	b	A	A	A	A	A	A	C	C	C	C	B
		100	rt	A	A	A	A	A	A	C	C	C	C	B
		100	b	A	A	A	A	A	A	C	C	C	C	B
Naphta	C <sub>10</sub> H <sub>8</sub>		rt	A	A	A	A	A	A	B	C	C	C	C
Nickel chloride	NiCl <sub>2</sub> ·6H <sub>2</sub> O	10	60	A	A	A	A	A	A	A	A	A	A	A
		10	b	A	A	A	A	A	A	A	A	A	A	A
		20	rt	A	A	A	A	A	A	A	A	A	A	A
		30	b	A	A	A	A	A	A	A	A	A	A	A
		80	95	A	A	A	A	A	A	A	A	A	A	A
Nickel nitrate	Ni(NO <sub>3</sub> ) <sub>2</sub> ·6H <sub>2</sub> O		rt	A	A	A	A	A	A	A	A	A	A	A
Nickel sulfate	NiSO <sub>4</sub> ·7H <sub>2</sub> O		80	A	A	A	A	A	A	A	A	A	A	A
Nitric acid	HNO <sub>3</sub>	7	rt	A	A	A	A	A	A	B	C	C	C	B
		7	b	A	A	A	B	A	B	C	C	C	C	B
		10	rt	A	A	A	A	A	A	B	C	C	C	B
		10	b	A	A	A	C	A	B	C	C	C	C	B
		25	rt	A	A	A	B	A	B	C	C	C	C	B
		25	b	A	A	A	C	A	B	C	C	C	C	B
		37	rt	A	A	A	C	A	B	C	C	C	C	B
		37	b	A	A	A	C	A	B	C	C	C	C	B
		50	rt	A	A	A	C	A	B	C	C	C	C	B
		50	b	A	A	A	C	A	B	C	C	C	C	B
		65	rt	A	A	A	C	A	B	C	C	C	C	B
		65	b	A	A	A	C	A	B	C	C	C	C	B
		70	100	A	A	A	C	A	B	C	C	C	C	B
	Fuming	100	rt				C	A	B	C	C	C	C	B
		100	50 - 70				C	A	B	C	C	C	C	B
		100	b				C	A	B	C	C	C	C	B
Nitrobenzene				A	A	A	A	A	A	A	A	A	A	A
Oxalic acid	H <sub>2</sub> C <sub>2</sub> O <sub>4</sub>	5	rt	A	A	A	A	A	A	A	A	B	A	A
		5	b	A	A	A	A	A	A	A	A	B	A	A
		10	rt	A	A	A	A	A	A	A	A	B	A	A
		10	b	A	A	A	A	A	A	A	A	B	A	A
		25	rt	A	A	A	A	A	A	A	A	B	A	A
		25	b	A	A	A	A	A	A	A	A	B	A	A
		50	rt	A	A	A	A	A	A	A	A	B	A	A
		50	b	A	A	A	A	A	A	A	A	B	A	A
		sat.	rt	A	A	A	A	A	A	A	A	B	A	A
		sat.	b	A	A	A	A	A	A	A	A	B	A	A
Ozone	O <sub>3</sub>	liquid		A	A	A	C	A	A	C	B	C	A	A
Perchloro ethylene	C <sub>2</sub> Cl <sub>4</sub>		rt	A	A	A	A	A	B	C	C	C	C	C
			b	A	A	A	A	A	B	C	C	C	C	C
Phenol	C <sub>6</sub> H <sub>5</sub> OH	pure	rt	A	A	A	A	A	B	C	C	C	C	C

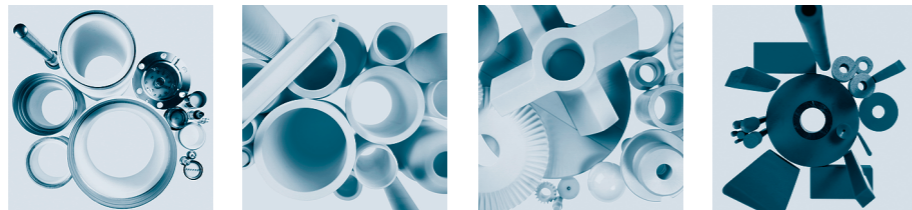
Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon		
				F99,7 AL23	FZM	FZT										
Phosphorous acid	H <sub>3</sub> PO <sub>4</sub>	1	b	A	A	A	A	A	B	C	C	C	C	C		
		1	rt	A	A	A	A	A	A	B	A	A	A	A	A	
		1	b	A	A	A	A	A	A	A	C	A	A	A	A	
		1	140	A	A	A	A	A	A	A	C	A	A	A	A	
		10	rt	A	A	A	A	A	A	A	B	A	A	A		
		10	b	A	A	A	A	A	A	A	C	A	A	A	A	
		30	rt	A	A	A	A	A	A	A	B	A	A	A	A	
		30	b	A	A	A	A	A	A	A	C	A	A	A	A	
		45	rt	A	A	A	A	A	A	A	B	A	A	A	A	
		45	b	A	A	A	A	A	A	A	C	A	A	A	A	
		80	rt	A	A	A	A	A	A	A	B	A	A	A	A	
		80	60	A	A	A	A	A	A	A	C	A	A	A	A	
		80	b	B	B	B	A	A	A	A	C	A	A	A	A	
		90	rt	A	A	A	A	A	A	A	B	A	A	A	A	
		90	b	B	B	B	C	A	A	A	C	A	A	A	A	
		conc.	rt	A	A	A	A	A	A	B	A	A	A	A		
		conc.	b	C	C	C	C	A	A	C	A	A	A	A		
Potassium chloride	KCl	10	rt	A	A	A	A	A	A	A	A	A	A	A		
		10	b	A	A	A	A	A	A	A	A	A	A	A		
		20	b	A	A	A	A	A	A	A	A	A	A	A		
		30	b	A	A	A	A	A	A	A	A	A	A	A		
			sat.	100	A	A	A	A	A	A	A	A	A	A	A	
Potassium cyanide	KCN	10	rt	A	A	A	A	A	B	C	A	B	A	A		
Potassium hydroxide	KOH	10	rt	A	A	A	A	A	C	B	A	A	A	A		
		10	b	A	A	A	A	A	C	B	A	A	A	A		
		20	rt	A	A	A	A	A	C	B	A	A	A	A		
		20	b	A	A	A	A	A	C	B	A	A	A	A		
		28	rt	A	A	A	A	A	C	B	A	A	A	A		
		28	b	A	A	A	A	A	C	B	A	A	A	A		
		40	til b	A	A	A	B	A	C	B	A	A	A	A		
		50	rt	A	A	A	A	A	C	B	A	A	A	A		
		50	b	B	A	B	C	A	C	B	A	A	A	A		
		Potassium hypochlorite	KOCl	20g Cl/l	til 40	A	A	A	A	A	A	C	C	C		
		130g Cl/l	rt	A	A	A	A	A	A	C	C	C				
		130g Cl/l	150	A	A	A	C	A	A	C	C	C				
Potassium nitrate	KNO <sub>3</sub>	25	rt	A	A	A	A	A	A	A	A	A	A	A		
		25	b	A	A	A	A	A	A	A	A	A	A	A		
		40	rt	A	A	A	A	A	A	A	A	A	A	A		
		40	b	A	A	A	A	A	A	A	A	A	A	A		
		50	rt	A	A	A	A	A	A	A	A	A	A	A		
		50	b	A	A	A	A	A	A	A	A	A	A	A		
				sat.	rt	A	A	A	A	A	A	A	A	A	A	
				sat.	b	A	A	A	A	A	A	A	A	A	A	
		Potassium perchlorate	KClO <sub>4</sub>	25	25	A	A	A	A	A			A	A		
				50	25	A	A	A	A	A			A	A		

Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon	
				F99,7 AL23	FZM	FZT									
Potassium permanganate	KMnO <sub>4</sub>	75	25	A	A	A	A	A			A	A			
		all	rt	A	A	A	A	A			A	A			
Potassium sulfate	K <sub>2</sub> SO <sub>4</sub>	10	rt	A	A	A	A	A	A	A	A	A	A	A	
		20	til 50	A	A	A	A	A	A	A	A	A	A	A	
Prussiate of potash	KCN	10	rt	A	A	A	A	A	B	C	A	B	A	A	
Pyridine	C <sub>5</sub> H <sub>5</sub> N	50	rt - 60	A	A	A	A	A	C	C	C	C	C	B	
		100	rt - 60	A	A	A	A	A	C	C	C	C	C	B	
Salt water			rt	A	A	A	A	A	A	A	A	A	A	A	
Sodium bicarbonate	NaHCO <sub>3</sub>	10	til b	A	A	A	A	A	B	B	A	A	A	A	
		20	40 - b	A	A	A	A	A	B	B	A	A	A	A	
Sodium bisulfate	NaHSO <sub>4</sub>	all	all	A	A	A	A	A	B	B	A	A	A	A	
		10	rt	A	A	A	A	A			A	A			
		10	b	A	A	A	A	A			A	A			
			sat.	rt	A	A	A	A	A			A	A		
			sat.	b	A	A	A	A	A			A	A		
Sodium bisulfite	NaHSO <sub>3</sub>	50	rt	A	A	A	A	A			A	A			
Sodium carbonate	Na <sub>2</sub> CO <sub>3</sub>	10	b	A	A	A	C	A	C	B	A	A	A	A	
		20	rt	A	A	A	A	A	C	B	A	A	A	A	
		20	50 - b	A	A	A	A	A	C	B	A	A	A	A	
		50	rt	A	A	A	A	A	C	B	A	A	A	A	
		50	b	A	A	A	A	A	C	B	A	A	A	A	
		sat.	rt	A	A	A	A	A	C	B	A	A	A		
		sat.	b	A	A	A	C	A	C	B	A	A	A		
Sodium chlorate	NaClO <sub>3</sub>	5	rt	A	A	A	A	A	A	A	A	A	A	A	
		5	b	A	A	A	A	A	A	A	A	A	A	A	
Sodium chloride	NaCl	3,5	rt	A	A	A	A	A	A	A	A	A	A	A	
		3,5	b	A	A	A	A	A	A	A	A	A	A	A	
Sodium chloride solution		techn.	rt	A	A	A	A	A	A	A	A	A	A	A	
			b	A	A	A	A	A	A	A	A	A	A	A	
Sodium chlorite	NaClO <sub>2</sub>	5	rt	A	A	A	C	A			C	C			
		5	b	A	A	A	C	A			C	C			
Sodium hydroxide (Caustic soda)	NaOH	10	rt	A	A	A	C	A			C	C			
		10	b	A	A	A	A	A	C	B	A	A	A	A	
		20	rt	A	A	A	A	A	C	B	A	A	A	A	
		20	b	A	A	A	C	A	C	B	A	A	A	A	
		34	rt	A	A	A	C	A	C	B	A	A	A	A	
		34	b	A	A	A	C	A	C	B	A	A	A	A	
		50	rt	A	A	A	C	A	C	B	A	A	A	A	
		50	b	B	A	B	C	A	C	B	A	A	A	A	
		60	b	B	A	B	C	A	C	B	A	A	A	A	
				70	b	C	B	C	C	A	C	B	A	A	A

Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon	
				F99,7 AL23	FZM	FZT									
Sodium hypochlorite (Bleaching soda)	NaOCl	10g Cl/l	rt	A	A	A	A	A	A	C	C	C	C	A	
		10g Cl/l	50	A	A	A	A	A	A	C	C	C	C	A	
		20g Cl/l	rt	A	A	A	A	A	A	C	C	C	C	A	
		20g Cl/l	40	A	A	A	A	A	A	C	C	C	C	A	
		120g Cl/l	rt	A	A	A	A	A	A	C	C	C	C	A	
Sodium nitrate	NaNO <sub>3</sub>	120g Cl/l	b	A	A	A	A	A	A	C	C	C	C	A	
			rt	A	A	A	A	A	A	A	A	A	A	A	
Sodium nitrite	NaNO <sub>2</sub>		100	A	A	A	A	A	A	A	A	A	A	A	
			70	A	A	A	A	A	A	A	A	A	A	A	
Sodium peroxide	Na <sub>2</sub> O <sub>2</sub>	10	rt	A	A	A	A	A			A	A			
		10	b	A	A	A	C	A			A	A			
Sodium sulfate	Na <sub>2</sub> SO <sub>4</sub> · 10H <sub>2</sub> O	sat.	rt	A	A	A	A	A	A	C	B	C	A	A	
		sat.	b	A	A	A	A	A	A	C	B	C	A	A	
Sodium sulfide	Na <sub>2</sub> S · 9H <sub>2</sub> O	25	rt	A	A	A	A	A	A	C	B	C	A	A	
		25	b	A	A	A	A	A	A	C	B	C	A	A	
			50	rt	A	A	A	A	A	A	C	B	C	A	A
			50	b	A	A	A	A	A	A	C	B	C	A	A
			sat.	rt	A	A	A	A	A	A	C	B	C	A	A
Sodium sulfite	Na <sub>2</sub> SO <sub>3</sub> · 7H <sub>2</sub> O	25	rt	A	A	A	A	A	A	C	B	C	A	A	
		25	b	A	A	A	A	A	A	C	B	C	A	A	
			50	rt	A	A	A	A	A	A	C	B	C	A	A
			50	b	A	A	A	A	A	A	C	B	C	A	A
			25	rt	A	A	A	A	A	A	C	B	C	A	A
Sodium thiol	Na <sub>2</sub> S <sub>2</sub> O <sub>3</sub> · 5H <sub>2</sub> O	25	rt	A	A	A	A	A	A	C	B	C	A	A	
		25	b	A	A	A	A	A	A	C	B	C	A	A	
Spinning bath	til 10% H <sub>2</sub> SO <sub>4</sub> over 10% H <sub>2</sub> SO <sub>4</sub>		70	A	A	A	A	A	A	C	A	B	A	A	
			70	A	A	A	A	A	A	C	A	B	A	A	
Stearic acid	C <sub>17</sub> H <sub>35</sub> COOH	techn.	100	A	A	A	A	A	A	A	B	C	C	C	
		techn.	150	A	A	A	A	A	A	A	B	C	C	C	
			100	rt	A	A	A	A	A	A	A	B	C	C	C
			100	b	A	A	A	A	A	A	A	B	C	C	C
			100	135	A	A	A	A	A	A	A	B	C	C	C
Sulfur chloride	S <sub>2</sub> Cl <sub>2</sub>		315	A	A	A	C								
			rt	A	A	A	A	A	C	C	C	C	C	C	
Sulfuric acid	H <sub>2</sub> SO <sub>4</sub>	2	rt	A	A	A	A	A	A	A	A	A	A	A	
		2	b	A	A	A	A	A	A	C	A	B	A	A	
		5	rt	A	A	A	A	A	A	A	A	A	A	A	
		5	b	A	A	A	A	A	A	C	A	B	A	A	
		10	rt	A	A	A	A	A	A	C	C	C	B	A	
		10	b	A	A	A	A	A	A	C	C	C	C	B	
		25	rt	A	A	A	A	A	A	C	C	C	B	A	
		25	b	A	A	A	A	A	A	C	C	C	C	B	
		50	rt	A	A	A	A	A	A	C	C	C	B	A	
		50	b	A	B	A	A	A	A	C	C	C	C	B	

Agent	Chemical Formula	Conc. (%)	Temp. (°C)	Oxide Ceramics			Graphite impreg-nated	PTFE	Viton	Perbunan	Neopren	Natural rubber	Butyl rubber	Hypalon	
				F99,7 AL23	FZM	FZT									
		60	rt	A	A	A	A	A	A	C	C	C	B	A	
		60	b	A	B	A	A	A	A	C	C	C	C	B	
		77	rt	A	A	A	A	A	A	C	C	C	B	B	
		77	b	B	C	B	C	A	A	C	C	C	C	C	
		80	rt	A	A	A	A	A	A	C	C	C	B	B	
		80	b	B	C	B	C	A	A	C	C	C	C	C	
		85	rt	A	A	A	A	A	A	C	C	C	B	B	
		85	b	B	C	B	C	A	A	C	C	C	C	C	
		90	rt	A	A	A	B	A	A	C	C	C	B	B	
		90	b	B	C	B	C	A	A	C	C	C	C	C	
		96	rt	A	A	A	B	A	A	C	C	C	B	B	
		96	b	B	C	B	C	A	A	C	C	C	C	C	
Sulfuric acid	H <sub>2</sub> SO <sub>4</sub>	sat.	rt	A	A	A	A	A	A	B	B	B	B	A	
Sulfuric acid + nitric acid	H <sub>2</sub> SO <sub>4</sub> :HNO <sub>3</sub>	10:90	35	A	A	A	C	A	B	C	C	C	C	B	
			30:70	35	A	A	A	C	A	B	C	C	C	C	B
			50:50	35	A	A	A	C	A	B	C	C	C	C	B
			60:40	35	A	A	A	C	A	B	C	C	C	C	B
			70:30	35	A	A	A	C	A	B	C	C	C	C	B
Tannic acid	C <sub>76</sub> H <sub>52</sub> O <sub>44</sub>		80:20	35	A	A	A	A	A	C	C	C	C	B	
			90:10	35	A	A	A	A	A	A	C	C	C	C	B
			99:1	35	A	A	A	A	A	A	C	C	C	C	B
		10	rt	A	A	A		A	A	C	B	B	B	A	
		10	b	A	A	A		A	A	C	B	B	B	A	
Tartaric acid	C <sub>4</sub> H <sub>6</sub> O <sub>6</sub>		50	50	A	A	A		A	A	C	B	B	A	
			50	b	A	A	A		A	A	C	B	B	A	
Tin chloride	SnCl <sub>2</sub> , SnCl <sub>4</sub>		all	rt	A	A	A	A	A	A	A	A	A	A	
			all	150	A	A	A	A	A	A	A	A	A	A	
Trichloro ethylene	CHCl=CCl <sub>2</sub>		rt	A	A	A	A	A	B	C	C	C	C		
Uric acid	C <sub>5</sub> H <sub>4</sub> N <sub>4</sub> O <sub>3</sub>		rt	A	A	A	A	A	A	A	A	A	A		
Zinc chloride	ZnCl <sub>2</sub>	10	rt	A	A	A	A	A	A	B	A	B	A	A	
		10	b	A	A	A	A	A	A	B	A	B	A	A	
		20	rt	A	A	A	A	A	A	A	B	A	B	A	
		20	b	A	A	A	A	A	A	A	B	A	B	A	
		60	rt	A	A	A	A	A	A	A	B	A	B	A	
		60	b	A	A	A	A	A	A	A	B	A	B	A	
		100	b	A	A	A	C	A	A	B	A	B	A		

FRIALIT®-DEGUSSIT® Oxide Ceramics for:  
Electrical Engineering  
High Temperature Technology  
Mechanical Engineering  
Surface Finishing



## COMPETENCE PLUS RESPONSIBILITY

Our customers rightly expect first class performance with lasting value.  
Besides our competence we also assume the responsibility for achieving that.  
Please ask for evidence: FRIALIT®-DEGUSSIT® is the technology and market  
leader in ceramic materials of the 21<sup>st</sup> Century.

### **FRIATEC AG**

FRIALIT®-DEGUSSIT® Division  
Postfach 710261, D-68222 Mannheim  
Steinzeugstraße 50, D-68229 Mannheim

Telefon: +49(0)621/486-0  
Telefax: +49(0)621/477-999  
E-Mail: [info-frialit@friatec.de](mailto:info-frialit@friatec.de)  
Internet: [www.friatec.de](http://www.friatec.de)

