

# Refractories For The Electronics Industry

## 1. SLABS (Conveying Pusher Trays)

Brand		R2023	Mulhard-616	
Material		High Alumina		
Refractoriness	%	38	33	
Apparent Porosity	SK	14.5	15.5	
Bulk Density		2.77	2.65	
Modulus of Rupture	R.T	10	9.5	
	1400°C	8	6	
Cold Crushing Strength	MPa	100	75	
Thermal Expansion	at1000°C	MPa	0.48	0.41
Creeping Rate	2MPa	%	0.3	1.1
Chemical Composition	SiO <sub>2</sub>	25.5	31.0	
	Al <sub>2</sub> O <sub>3</sub>	72.7	67.2	
Remarks		High Anticorrosive		

## 2. SETTERS

Brand		TOKU-A-S	CORANDEX-S	CELITE-A	ZIRNIA-B4	ZIRNIA-Y1	TOMAG-BE	HE708	HE730	HE741	
Material		Almina			Zirconia		Magnesia	Magnesia/Spinel		Zilconia	
Refractoriness	SK	>40	>40	>40	-	-	-	-	-	-	
Apparent Porosity	%	25.0	23.0	75.5	29.3	25.0	21.5	20.0	22.0	38.0	
Bulk Density		3.00	2.85	1.00	3.97	4.30	2.80	2.85	2.83	3.54	
Modulus of Rupture	MPa	23	17	6	20	19	16	8	22	19	
		-	-	8	-	-	-	5	-	-	
Thermal Expansion	at1000°C	%	0.75	0.65	0.68	0.85	1.03	1.35	1.13	0.85	
Chemical Composition	%	SiO <sub>2</sub>	0.1	7.3	3.2	0.5	0.1	0.4	0.2	-	0.5
		Al <sub>2</sub> O <sub>3</sub>	99.5	92.0	96.2	-	-	-	18.0	64.5	-
		ZrO <sub>2</sub>	-	-	-	93.3	90.0	-	4.0	9.4	94.5
		CaO	-	-	-	4.5	Y <sub>2</sub> O <sub>3</sub> : 9.3	0.2	0.6	-	4.5
		MgO	-	-	-	-	-	98.3	76.1	25.5	-
Remarks		Applications to ferrite, ceramic capacitors, etc. according to materials processed									

## 3. PLATES AND SAGGERS

Brand		SE727	SE709	AM	SM	R2031	SE728	HE748	HE749	
Material										
Refractoriness	SK	>40	>40	40	39	40	39	>40	>40	
Apparent Porosity	%	20.0	22.0	24.5	24.3	21.5	19.2	32.5	18.0	
Bulk Density		2.85	2.73	2.77	2.68	2.64	2.62	2.30	2.85	
Modulus of Rupture	R.T.	MPa	5.5	10	14	7	8.5	8.5	6.5	6
			1400°C	10	24	10	5	8	11	8.5
Thermal Expansion	at1000°C	%	0.54	0.50	0.67	0.57	0.45	0.45	0.55	0.52
Chemical Composition	%	SiO <sub>2</sub>	9.5	12.1	8.0	18.0	17.8	22.4	15.0	12.6
		Al <sub>2</sub> O <sub>3</sub>	89.8	87.0	91.0	81.0	80.7	76.0	84.5	86.9
Remarks		Selected according to the operating conditions, the purpose of applications, etc.								

## Kiln Furniture For Firing Porcelain And Roof Tiles

Brand	NEWBON-A	SE735	SE703	NEWBON-CB	NEWBON-S	NEWBON-N	NEWBON-NN
Material	Silicon Carbide						
Refractoriness SK	-	-	-	-	-	-	-
Apparent Porosity %	14.1	11.8	14.0	13.2 (16.3)	19.0	12.5	13.1
Bulk Density	2.59	2.74	2.69	2.73 (2.55)	2.50	2.60	2.59
Modulus of Rupture R.T MPa	34.3	47.5	31.5	27.0 (27.0)	25.0	-	55
Cold Crushing Strengt MPa	108.0	-	-	-	-	210.5	-
Thermal Expansion at 1000°C %	0.43	0.46	0.43	0.43	0.42	0.40	0.35
Chemical Composition %	SiO <sub>2</sub>	-	-	-	4.2	(Si <sub>3</sub> N <sub>4</sub> :15.0)	Si <sub>3</sub> N <sub>4</sub> :25.0
	SiC	96.0	95.7	94.0	95.1	91.5	SiC:74.0
Remarks	Casting products, like tube column etc.	Plates, slabs, etc.	Muffle plates etc.	Blocks, etc.			

Brand	FERON-C	FERON-H	FERON-M	FERON-L
Material	Silicon Carbide			
Refractoriness SK	-	-	-	-
Apparent Porosity %	15.1	18.0	19.1	18.8
Bulk Density	2.54	2.52	2.38	2.33
Modulus of Rupture R.T. MPa	24.5	23.5	19.5	19.5
Cold Crushing Strength MPa	98.0	98.0	78.0	98.0
Thermal Expansion at 1000°C %	0.43	0.45	0.45	0.50
Chemical Composition %	SiO <sub>2</sub>	-	6.1	10.7
	Al <sub>2</sub> O <sub>3</sub>	-	2.8	4.1
	SiC	96.5	88.8	77.2
Remarks	Slabs, muffle plate	Plates	Bridges	Column

## Refractories For Industrial Furnaces And Enclosures

Brand	TOLITE-HAS	TOLITE-HS	TOLITE-ZR	SE734	ZIRNIA
Material	Alumina	High Alumina	Zirconia		
Refractoriness SK	40	39	40	>40	>40
Apparent Porosity %	56.5	57.0	53.0	18.1	21.5
Bulk Density	1.50	1.40	2.65	4.86	4.42
Cold Crushing Strength MPa	17.0	12.5	16.5	61	70.0
Thermal Expansion at 1000°C %	0.78	0.72	0.85	0.98	0.82
Refractoriness Under Load T <sub>2</sub> °C 0.1 MPa	1700	1620	1700	>1700	-
Thermal Conductivity W/m k	at 350°C	1.05	0.99	0.52	-
	at 1000°C	0.87	0.87	0.58	-
Chemical Composition %	SiO <sub>2</sub>	0.3	12.0	ZrO <sub>2</sub> : 93.5	ZrO <sub>2</sub> : 91.6
	Al <sub>2</sub> O <sub>3</sub>	99.4	86.3	CaO : 4.6	Y <sub>2</sub> O <sub>3</sub> : 7.8
Remarks	Load softening point is according to JIS R2209-1991				