

#### **Data Sheet**

# AL 300<sup>TM</sup> (Mac-A976W)

## Description

A top quality alumina ceramic of 97.6%  $Al_2O_3$  content, widely used for high integrity components where its exceptional electrical and thermal properties are essential to operational stability and reliability.

### Prime Features:

- Exceptionally high dielectric strength
- Consistent dielectric constant
- Dense, non-porous and vacuum tight
- Readily accepts moly-manganese metallizing for high temperature brazing of assemblies
- Electrically and dimensionally stable across a wide temperature range
- Resists chemical attack and abrasion
- Good thermal conductivity

# **Specifications**

Quality Assurance to ISO 9001

# **Physical Properties**

Colour
Bulk Density (fired)
Porosity (apparent)
Rockwell Hardness (R45N)
Compressive Strengths
Flexural Strength
Thermal Conductivity
Thermal Expansion Coefficient
10-6/C [10-6/F]

# Maximum no-load temperature Dielectric Strength \* Dielectric Constant K<sup>I</sup>

@10MHz

@1000MHz

@8500MHz

# Dissipation factor, $tan\delta$

@I0MHz

@1000MHz

@8500MHz

#### Loss factor, K<sup>1</sup>.tan δ

@10MHz

@1000MHz

@8500MHz

Volume resistivity, ohm.cm: \*ASTM Standard D149-97a<sup>13</sup>

# Typical Applications:

- Power distribution equipment
- High power tubes for klystron and x-ray equipment used in defence, medical and communications
- Electro-optical equipment
- Flow measurement devices
- Pressure sensors

## **Production Capabilities:**

- Isostatic and dry pressing of small to large complex components
- CNC grinding and lapping to very tight tolerances
- Prototype, batch and volume production
- Complete documentation and traceability
- Functional coatings, such as Cr<sub>2</sub>O<sub>3</sub>, MnTiCr...

3.76 g/cm³ 0.136 lb/in³ 0.136 lb/in³ 0 (fully dense) % nominal 75   >1720 MPa	White		
75  > 1720 MPa  296 MPa  43,000 lb/in²  26.8 W/m.K  15.5 BTU/ft.hr.°F  25-200C [77-390°F]  6.9 [3.8]  200-400C [390-750°F]  7.8 [4.3]  400-600C [750-1110°F]  8.5 [4.7]  600-800C [1110-1470°F]  8.8 [4.9]  800-1000C [1470-1830°F]  9.0 [5.0]  1650 C  3000°F  32.6 dc kV/mm  828 V/mil  25C  300C  9.53  9.91  10.14  9.00  9.04  9.32  9.54   0.00004  0.00016  0.00052  0.00030  0.00045  0.00040  0.000158  0.000527  0.000207  - 0.000407  0.000373  0.00687	3.76 g/cm <sup>3</sup>	0.136 lb/in <sup>3</sup>	
>1720 MPa	0 (fully dense) % nominal		
296 MPa       43,000 lb/in²         26.8 W/m.K       15.5 BTU/ft.hr.°F         25-200C [77-390°F]       6.9 [3.8]         200-400C [390-750°F]       7.8 [4.3]         400-600C [750-1110°F]       8.5 [4.7]         600-800C [1110-1470°F]       8.8 [4.9]         800-1000C [1470-1830°F]       9.0 [5.0]         1650 C       3000°F         32.6 dc kV/mm       828 V/mil         25C       300C       500C         9.53       9.91       10.14         9.00       -       -         9.04       9.32       9.54         0.00004       0.00016       0.00052         0.00030       -       -         0.00045       0.00040       0.00072         0.00207       -       -         0.00407       0.00373       0.00687	75		
26.8 W/m.K       15.5 BTU/ft.hr.°F         25-200C [77-390°F]       6.9 [3.8]         200-400C [390-750°F]       7.8 [4.3]         400-600C [750-1110°F]       8.5 [4.7]         600-800C [1110-1470°F]       8.8 [4.9]         800-1000C [1470-1830°F]       9.0 [5.0]         1650 C       3000°F         32.6 dc kV/mm       828 V/mil         25C       300C       500C         9.53       9.91       10.14         9.00       -       -         9.04       9.32       9.54         0.00004       0.00016       0.00052         0.00030       -       -         0.00045       0.00040       0.00072         0.00038       0.00158       0.00527         0.00207       -       -         0.00407       0.00373       0.00687	> 1720 MPa	>250,000 lb/in <sup>2</sup>	
25-200C [77-390°F] 6.9 [3.8]  200-400C [390-750°F] 7.8 [4.3]  400-600C [750-1110°F] 8.5 [4.7]  600-800C [1110-1470°F] 8.8 [4.9]  800-1000C [1470-1830°F] 9.0 [5.0]  1650 C 3000°F  32.6 dc kV/mm 828 V/mil  25C 300C 500C  9.53 9.91 10.14  9.00  9.04 9.32 9.54  0.00004 0.00016 0.00052  0.00030  0.00045 0.00040 0.00018 0.00072  0.00038 0.00158 0.00527  0.00207  0.000407 0.00373 0.00687	296 MPa	43,000 lb/in <sup>2</sup>	
200-400C [390-750°F]       7.8 [4.3]         400-600C [750-1110°F]       8.5 [4.7]         600-800C [1110-1470°F]       8.8 [4.9]         800-1000C [1470-1830°F]       9.0 [5.0]         1650 C       3000°F         32.6 dc kV/mm       828 V/mil         25C       300C       500C         9.53       9.91       10.14         9.00       -       -         9.04       9.32       9.54         0.00004       0.00016       0.00052         0.00030       -       -         0.00045       0.00040       0.00072         0.00038       0.00158       0.00527         0.00207       -       -         0.00407       0.00373       0.00687		15.5 BTU/ft.hr.°F	
400-600C [750-1110°F]       8.5 [4.7]         600-800C [1110-1470°F]       8.8 [4.9]         800-1000C [1470-1830°F]       9.0 [5.0]         1650 C       3000°F         32.6 dc kV/mm       828 V/mil         25C       300C       500C         9.53       9.91       10.14         9.00       -       -         9.04       9.32       9.54         0.00004       0.00016       0.00052         0.00030       -       -         0.00045       0.00040       0.00072         0.00207       -       -         0.00407       0.00373       0.00687	25-200C [77-390°F]	6.9 [3.8]	
600-800C [1110-1470°F]       8.8 [4.9]         800-1000C [1470-1830°F]       9.0 [5.0]         1650 C       3000°F         32.6 dc kV/mm       828 V/mil         25C       300C       500C         9.53       9.91       10.14         9.00       -       -         9.04       9.32       9.54         0.00004       0.00016       0.00052         0.00030       -       -         0.00045       0.00040       0.00072         0.00038       0.00158       0.00527         0.00207       -       -         0.00407       0.00373       0.00687	200-400C [390-750°F]	7.8 [4.3]	
800-1000C [1470-1830°F]       9.0 [5.0]         1650 C       3000°F         32.6 dc kV/mm       828 V/mil         25C       300C         9.53       9.91         9.00       -         -       -         9.04       9.32         9.54            0.00004       0.00016       0.00052         0.00030       -       -         0.00045       0.00040       0.00072         0.00038       0.00158       0.00527         0.00207       -       -         0.00407       0.00373       0.00687	400-600C [750-1110°F]	8.5 [4.7]	
1650 C     3000°F       32.6 dc kV/mm     828 V/mil       25C     300C     500C       9.53     9.91     10.14       9.00     -     -       9.04     9.32     9.54       0.00004     0.00016     0.00052       0.00030     -     -       0.00045     0.00040     0.00072       0.00038     0.00158     0.00527       0.00207     -     -       0.00407     0.00373     0.00687	600-800C [III0-I470°F]	8.8 [4.9]	
32.6 dc kV/mm         828 V/mil           25C         300C         500C           9.53         9.91         10.14           9.00         -         -           9.04         9.32         9.54           0.00004         0.00016         0.00052           0.00030         -         -           0.00045         0.00040         0.00072           0.00038         0.00158         0.00527           0.00207         -         -           0.00407         0.00373         0.00687	800-1000C [1470-1830°F]	9.0 [5.0]	
25C         300C         500C           9.53         9.91         10.14           9.00         -         -           9.04         9.32         9.54           0.00004         0.00016         0.00052           0.00030         -         -           0.00045         0.00040         0.00072           0.00038         0.00158         0.00527           0.00207         -         -           0.00407         0.00373         0.00687	1650 C	3000°F	
9.53     9.91     10.14       9.00     -     -       9.04     9.32     9.54       0.00004     0.00016     0.00052       0.00030     -     -       0.00045     0.00040     0.00072       0.00038     0.00158     0.00527       0.00207     -     -       0.00407     0.00373     0.00687	32.6 dc kV/mm	828 V/mil	
9.00     -       9.04     9.32       0.00004     0.00016       0.00030     -       0.00045     0.00040       0.00038     0.00158       0.00207     -       0.00407     0.00373       0.00687	25C	300C	500C
9.04       9.32       9.54         0.00004       0.00016       0.00052         0.00030       -       -         0.00045       0.00040       0.00072         0.00038       0.00158       0.00527         0.00207       -       -         0.00407       0.00373       0.00687	9.53	9.91	10.14
0.00004         0.00016         0.00052           0.00030         -         -           0.00045         0.00040         0.00072           0.00038         0.00158         0.00527           0.00207         -         -           0.00407         0.00373         0.00687		-	-
0.00030       -       -         0.00045       0.00040       0.00072         0.00038       0.00158       0.00527         0.00207       -       -         0.00407       0.00373       0.00687	9.04	9.32	9.54
0.00030       -       -         0.00045       0.00040       0.00072         0.00038       0.00158       0.00527         0.00207       -       -         0.00407       0.00373       0.00687			
0.00045       0.00040       0.00072         0.00038       0.00158       0.00527         0.00207       -       -         0.00407       0.00373       0.00687	0.00004	0.00016	0.00052
0.00038         0.00158         0.00527           0.00207         -         -           0.00407         0.00373         0.00687	0.00030	-	-
0.00207     -     -       0.00407     0.00373     0.00687	0.00045	0.00040	0.00072
0.00207     -     -       0.00407     0.00373     0.00687			
0.00407 0.00373 0.00687	0.00038	0.00158	0.00527
	0.00207	-	-
$> 10^{14}$ $1.0 \times 10^{12}$ $8.4 \times 10^{10}$	0.00407	0.00373	0.00687
	>1014	1.0x10 <sup>12</sup>	8.4 × 10 <sup>10</sup>