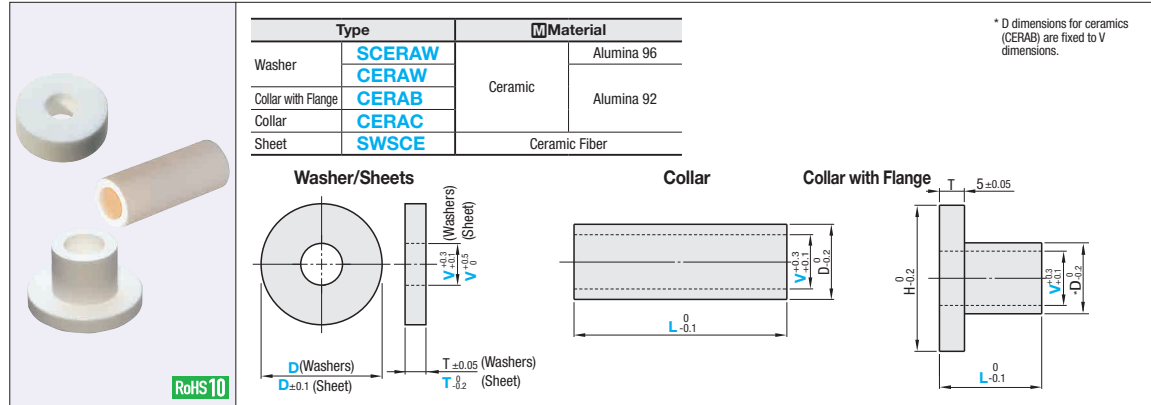


Ceramic Washers / Sheets / Collars

Thermal Insulation Washers / Collars



Type	Material
Washer	Alumina 96
Collar with Flange	Alumina 92
Collar	Ceramic
Sheet	Ceramic Fiber

* D dimensions for ceramics (CERAB) are fixed to V dimensions.

Washer (Alumina 92)

Part Number	D	V	T	Unit Price
10	3			
12	4			
15	5			
20	6			
25	8			
30	10			
35	12			
40	16			
45	20			

Ordering Example: Part Number CERAW10 - V - T

Bushings for Locating Pins - Ceramics Type (P1686), Ceramics Rods (P322), and Ceramics Circular Plates (P991) are also available.

Collar with Flange (Alumina 92)

Part Number	L Selection	H	D	Unit Price
3	10 6			
4	12 8			
5	15 10			
6	20 10			
8	25 12			
10	30 14			
12	35 20			
16	40 20			
20	45 25			

Ordering Example: Part Number CERAB6 - L

Collar (Alumina 92)

Part Number	V	L	D	Unit Price
3	6			
4	8			
5	10			
6	10			
8	12			
10	14			
12	20			
16	20			
20	25			

Ordering Example: Part Number CERAC16 - L

Washer (Alumina 96)

Part Number	D	V Selection	T	Unit Price
10	3	4 5		
12	4	5 6		
15	5	6 8		
20	6	8		

Ordering Example: Part Number SCERAW10 - V

Sheet (Ceramic Fiber)

Part Number	D	V Selection	T	Unit Price
8	3	4		
10	4	5 6		
12	4	5 6 8		
15	5	6 8 10		
20	6	8 10 12		
25	8	10 12 15		
30	8	10 12 15 20		

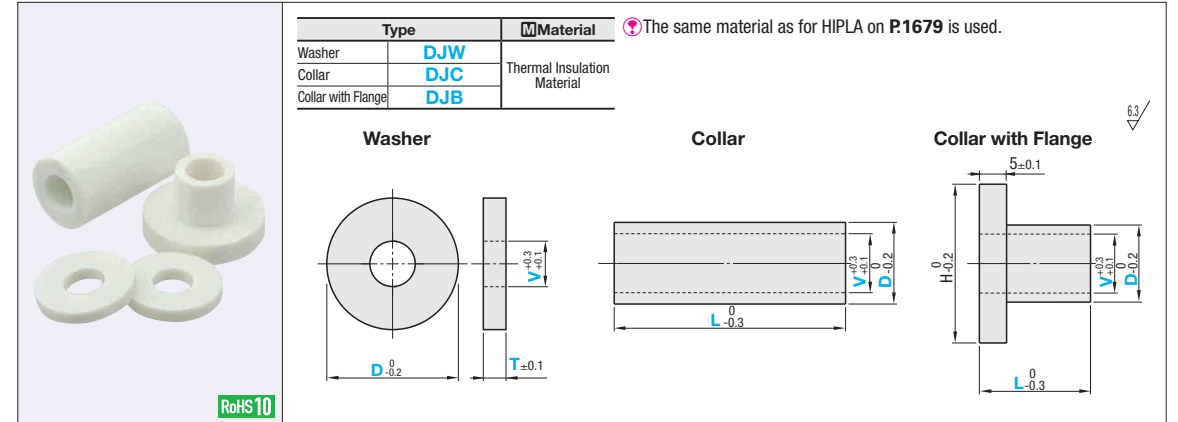
Ordering Example: Part Number SWSCE10 - V - T

Property Values of Alumina 92 / Alumina 96 / Ceramic Fiber (Reference: The data in the table are the values of materials.)

Properties	Material Name	Alumina 92	Alumina 96	Ceramic Fiber
Dielectric Breakdown Parallel to Lamination	kV/mm	~10	10	-
Volume Resistance Force	Ω -cm	$\sim 10^{14}$	$\sim 10^{14}$	-
Bending Strength	kN/cm ²	24~34	33	-
Compression Strength	kN/cm ²	147~245	210	-
Tensile Strength	MPa	1000~1200	1500	0.6
Expansion Coefficient	1/°C	8×10^{-6}	7.6×10^{-6}	-
Thermal Conductivity	cal/cm·sec·°C	$3.6 \sim 5.0 \times 10^{-2}$	5.0×10^{-2}	1.7×10^{-4}
Heat Resistance	°C	1000~1200	1500	1300
Water Absorption Ratio	%	0	0	-
Specific Gravity	-	3.7	3.8	0.25
Main Material	-	Al ₂ O ₃ (92%)	Al ₂ O ₃ (96%)	-

These materials are fragile. Please handle with care.

This material excels in insulation resistance as well as heat insulation.



Type	Material
Washer	Thermal Insulation Material
Collar	
Collar with Flange	

The same material as for HIPLA on P.1679 is used.

Washer (Heat Insulation Material)

Part Number	D	V Selection	T	Unit Price
10	3	4 5	3 5	
12	4	5 6	3 5	
16	5	6 8	3 5	
20	5	6 8	3 5	
25	5	6 8 10	3 5	

Ordering Example: Part Number DJW10 - V - T

Collar (Heat Insulation Material)

Part Number	D	V Selection	L	Unit Price
8	3	4 5		
10	4	5 6		
12	4	5 6 8		
16	5	6 8		
20	5	6 8 10		

Ordering Example: Part Number DJC8 - V - L

Collar with Flange (Heat Insulation Material)

Part Number	D	L	H	Unit Price
3	8	10	12	
4	8	10	15	
5	10	12	15	
6	10	12	20	
8	12	15	20	
10	20	15	30	

Ordering Example: Part Number DJB4 - D - L

Properties of Heat Insulation Material (Values shown below are for reference only.)

Mechanical Properties			Thermal and Electrical Characteristics		
Tensile Strength	MPa	108	Deflection Temperature under Load (1.82Mpa)	°C	400~
Elongation	%	0.7	Linear Expansion Coefficient	1/°C	$2.6 \sim 3.5 \times 10^{-5}$
Bending Strength	Vertical	MPa	Thermal Conductivity	W/m·K (cal/cm·sec·°C)	0.24 (5.7x10 ⁻⁴)
			Dielectric Constant (1MHz)	-	3.8
Flexural Modulus		17900	Dissipation Factor (1MHz)	-	0.005
Compression Strength	Vertical	439~410	Volume Resistivity	Ω ·cm	1.0×10^{14}
	Parallel	98 ~ 90	Dielectric Breakdown Strength (Breakdown Voltage)	kV/mm	15
Izod Impact Strength (Notched)	J/cm	2.9	Arc Resistance	sec	345
Rockwell Hardness	R	R113	Moisture Absorption (At 23°Cx24h)	%	0.05
Glass Fiber Content	-	Available	Ambient Operating Temperature	°C	~400
Specific Gravity	-	2.0			

*1 Bending Strength maintains the minimum value even at 400 degrees Celsius.
*2 2.6 = ambient temperature ~ 200°C, 3.5 = ambient temperature ~ 400°C.

About Direction of Material Lamination

Laminated directions of washer and collar are different (Figure below). Therefore, mechanical strength varies depending on direction of the lamination.

Washers are laminated in the vertical direction.



Collar and Collar with Flange are laminated in the radial direction. Please note that the mechanical strength is less than washer.



The above are reference images. Actual products may differ from the images.