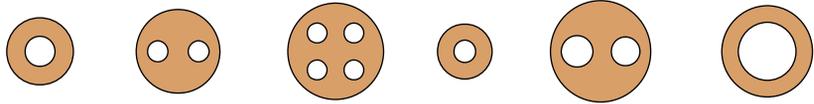


# Thermocouple Insulators



## Tolerances

The diameter and "out of roundness" of OMEGA's insulators is plus or minus 5% or ±0.015", whichever is greater. The straightness is at least 1/32 inch for each six-inch length. The following table lists the maximum recommended

wire diameters which should be used with six-inch sections. Closer tolerances are permissible with shorter sections, but the minimum clearance tolerance is 5% or ±0.015", whichever is greater.

Bore Diameter	1/8"	3/32"	5/64"	1/16"	3/64"	1/32"	0.020"	1/64"	0.005"
Maximum Wire Diameter	0.102"	0.064"	0.064"	0.040"	0.032"	0.020"	0.012"	0.008"	0.001"



Assortment of OMEGA's miniature insulators showing relative size. Sizes up to 1/4" OD are available from stock. Call Custom Engineering for Pricing of Specific Tolerance Insulators.

## OMEGATITE® 450

This is an impervious, recrystallized, pure alumina ceramic containing over 99.8% Al<sub>2</sub>O<sub>3</sub>. It has the most superior gas and vacuum tightness and electrical insulating properties at elevated temperatures. It is non-reactive and recommended for use with platinum, as well as tungsten and molybdenum thermocouple alloys. The maximum service temperature is 1900°C (3450°F).

## OMEGATITE 350

This is an impervious, recrystallized pure alumina ceramic containing over 99% Al<sub>2</sub>O<sub>3</sub>. It has superior gas and vacuum tightness and electrical insulating properties at elevated temperatures. It is non-reactive and compatible with tungsten and molybdenum thermocouple alloys. The maximum service temperature is 1900°C (3450°F).

## OMEGATITE 200

This material is recommended for most thermocouple applications. It consists of a mullite type ceramic capable of withstanding temperatures up to 1650°C (3000°F).

### Typical Physical Properties

Properties	OMEGATITE 450	OMEGATITE 350	OMEGATITE 200
Constitution	99.8% Al <sub>2</sub> O <sub>3</sub>	99% Al <sub>2</sub> O <sub>3</sub>	80% Mullite 20% Glass
Water Absorption	0.00	0.00	0.00
Specific Gravity	3.85	3.7	2.4
Gas Permeability	Gas Tight	Gas Tight	Gas Tight
Compressive Strength (psi)	300,000	300,000	100,000
Tensile Strength (psi)	30,000	30,000	14,000
Transverse Strength (psi)	55,000	55,000	20,000
Coefficient of Linear Thermal Expansion			
24-250°C	6.2 x 10 <sup>-6</sup>	6.6 x 10 <sup>-6</sup>	.....
24-500°C	7.4 x 10 <sup>-6</sup>	7.3 x 10 <sup>-6</sup>	.....
24-1000°C	8.5 x 10 <sup>-6</sup>	8.1 x 10 <sup>-6</sup>	.....
24-1500°C	9.8 x 10 <sup>-6</sup>	.....	.....
Approximate Thermal Conductivity (BTU inch/ft <sup>2</sup> hour °F)			
24°C	230	210	16
800°C	60	50	.....
Maximum Service Temperature	1950°C 3540°F	1900°C 3450°F	1650°C 3000°F
Dielectric Constant (1MC)	9.29	8.61	4.95
Dielectric Strength (volts/mil)	230	250	250
Volume Resistivity ( cm)	10 <sup>13</sup>	10 <sup>13</sup>	.....
Te Value	800°C	1100°C	.....
Hardness (Mohs Scale)	9	9	7
Fabrication Method	Cast or Extrusion	Cast or Extrusion	Extrusion

### Typical Chemical Analyses

	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	MgO	Na <sub>2</sub> O	Ca	Fe <sub>2</sub> O <sub>3</sub>	Cr <sub>2</sub> O <sub>3</sub>	TiO <sub>2</sub>	MnO	ZrO <sub>2</sub>	K <sub>2</sub> O
OMEGATITE® 450	99.8	0.070	0.050	0.005	0.030	0.025	<0.003	0.004	0.001	.....	.....
OMEGATITE® 350	99.0	0.7	0.07	0.05	0.030	0.07	.....	—	.....	.....	.....
OMEGATITE® 200	55.4	42.0	0.04	0.5	0.1	0.8	.....	0.5	.....	.....	0.7

**Note:** All properties are average for test specimens. Tests were performed according to ASTM specifications.

**WIDE RANGE OF SIZES AVAILABLE**

OMEGA® thermocouple insulators are supplied in a wide range of sizes. Sizes up to 1/4 inch OD are available from stock. Other sizes and lengths by quotation.

**IMPORTANT ORDERING NOTES**

\* **LENGTHS** ■ Prices quoted are for standard six (6) inch length ceramics. Other sizes and styles are available on special order.

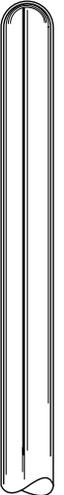
**SPECIAL SIZES OR SHAPES** ■ Orders for special sizes, shapes and tolerances should be explicit and accompanied by a sketch or print.

Single-hole ceramics with closed end are available. See PTRM and PTRM series at [omega.com](http://omega.com).

Discount Schedule	
1-4 pkg.....	Net 25-49 pkg.....18%
5-10 pkg.....	9% 50-99 pkg.....20%
11-24 pkg.....	12% 100 pkg and up...25%

Single hole ceramics with closed end are available. Consult Sales Department.

*Special Lengths and Metric Dimensions Available. Consult Sales for Details.*



**Single Hole Round Insulators**

**To Order Visit [omega.com/orx\\_insulators](http://omega.com/orx_insulators) for Pricing and Details**

Outside Diameter	Inside Diameter	OMEGATITE 450	OMEGATITE 350	OMEGATITE 200
		Model Number	Model Number	Model Number
1/4	1/8	ORX-1814	ORA-1814	ORM-1814
1/4	3/32	ORX-33214	ORA-33214	ORM-33214
1/4	1/16	ORX-11614	ORA-11614	ORM-11614
3/16	3/32	ORX-332316	ORA-332316	ORM-332316
3/16	1/16	ORX-116316	ORA-116316	ORM-116316
1/8	1/16	ORX-11618	ORA-11618	ORM-11618
1/16	1/32	ORX-132116	ORA-132116	ORM-132116
1/32	0.020	ORX-020132	ORA-020132	ORM-020132

**Two Hole Round Insulators**

Outside Diameter	Inside Diameter	OMEGATITE 450	OMEGATITE 350	OMEGATITE 200
		Model Number	Model Number	Model Number
1/4	5/64	TRX-56414	TRA-56414	TRM-56414
1/4	1/16	TRX-11614	TRA-11614	TRM-11614
3/16	1/16	TRX-116316	TRA-116316	TRM-116316
1/8	0.040	TRX-04018	TRA-04018	TRM-04018
1/8	1/32	TRX-13218	TRA-13218	TRM-13218
1/8	0.020	TRX-02018	TRA-02018	TRM-02018
1/16	1/64	TRX-164116	TRA-164116	TRM-164116
3/64	0.010	TRX-010364	TRA-010364	TRM-010364
1/32	0.005	TRX-005132	TRA-005132	TRM-005132

**Four Hole Round Insulators**

Outside Diameter	Inside Diameter	OMEGATITE 450	OMEGATITE 350	OMEGATITE 200
		Model Number	Model Number	Model Number
1/4	1/16	FRX-11614	FRA-11614	FRM-11614
3/16	3/64	FRX-364316	FRA-364316	FRM-364316
3/16	1/32	FRX-132316	FRA-132316	FRM-132316
1/8	0.020	FRX-02018	FRA-02018	FRM-02018
1/16	1/64	FRX-164116	FRA-164116	FRM-164116
1/32	0.005	FRX-005132	FRA-005132	FRM-005132

\* All stock insulators are 6" in length. Other sizes, styles and lengths by quotation.