

Ceramco's Solid Ceramic Fasteners – Technical Summary

Material Properties

All Ceramco's stock solid ceramic Metric and U.S. Inch machine screws, bolts, matching hex nuts & flat washers are produced from the same material formulations as are many of our custom ceramic parts, including blends of either YTZP zirconia when toughness and other unique properties are required, or our A998 alumina (aluminum oxide, Al₂O₃).

Please refer to datasheet: "Ceramco's Production Formulations and Corresponding Properties," for specific information on the applicable formulations, materials strength and maximum service temperature.

Installation Torque Values

Ceramco has established the below listed (maximum) service torque values for customers whose application(s) may be dependent on specific torque or preload requirements

Metric	Alumina	Zirconia
Size	Svc. Torque (in*Lbf)	Svc. Torque (in*Lbf)
M2 x 0.4	0.4	0.5
M3 x 0.5	1.0	1.9
M4 x 0.7	2.0	5.5
M5 x 0.8	4.0	8.4
M6 x 1.0	11.0	15.4
M8 x 1.25	27.0	---

U.S. Inch	Alumina	Zirconia
Size	Svc. Torque (in*Lbf)	Svc. Torque (in*Lbf)
#0-80	0.1	---
#2-56	0.4	0.6
#4-40	0.5	1.2
#5-40	1.3	1.8
#6-32	0.5	2.1
#8-32	2.0	4.2
#10-24	4.1	5.8
#10-32	2.0	7.5
1/4" - 20	13.5	12.3
5/16" - 18	25.7	---
3/8" - 16	40.4	---

Manufacturing & Quality Assurance

Ceramco's stock, solid ceramic fasteners are 100% molded, using our near-net shaping process, then fired to full density, never machined or fatigued from harsh grinding.

Tolerances on Length

- Bolts and screws up to 1" (25 mm): ±1/32" (0.8 mm)
- Bolts and screws 1" (25 mm) or longer: ±1/16" (1.6 mm)

Threads

- Inspected using a class 2 fastener ^a
- Pitch diameter of male threads will not exceed the max allowable according to Class 2
- Minimum allowable pitch diameter of male threads may be below that of Class 2
 - Conversely for female threads
- Engaging more than 6-10 threads on any male fastener is not recommended

^a Shrink factor variations in processing and stack-up tolerance cannot be controlled on the thread pitch, precluding their checking with a thread gauge.

Warranty

No warranty with respect to torque strength and tensile strength is extended, nor implied. Ceramic materials are inherently brittle and display catastrophic failure mode if impacted, or stressed beyond the material's limit.

Further testing at Ceramco includes extensive random dimensional verification of samples and the monitoring and documentation of each raw materials batch.