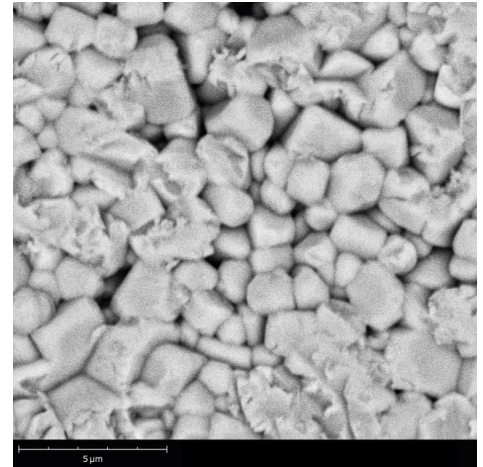


## Pz12 (Lead-Free)

### NBT-BT Piezoceramic Material

#### Description

Pz12 is a lead-free piezoceramic formulation based on the sodium bismuth titanate-barium titanate system (NBT-BT). It has been developed as a lead-free alternative to traditional hard-doped PZT ceramics and is available for customers who are looking to replace the lead-containing piezoceramics in their applications.



#### Key Features and Benefits

- Lead-Free Product
- Candidate for Replacing Hard-Doped PZT

#### Ideal Applications

- Underwater Transmitters
- Therapeutic Medical Ultrasound
- Ultrasonic Cleaning, Cutting and Welding

Property	Symbol	Unit	Value
Relative Free Dielectric Constant (1 kHz)	$K_{33}^{\sigma}$	-	700
Dielectric Dissipation Factor (1 kHz)	$\tan\delta$	-	0.027
Depoling Temperature	$T_d$	°C	200
Recommended Operating Range	$T <$	°C	120
Density	$\rho$	g/cm <sup>3</sup>	5.7
Mechanical Quality Factors	$Q_{mp}$	-	185
	$Q_{mt}$	-	170
Coupling Coefficients	$k_p$	-	0.17
	$k_t$	-	0.41
Piezoelectric Charge Coefficient (Displacement Coefficient)	$d_{33}$	pC/N	110
Frequency Constants	$N_p$	Hz.m	2700
	$N_t$	Hz.m	2400
Acoustic Impedance	$Z_a$	MRayl	30