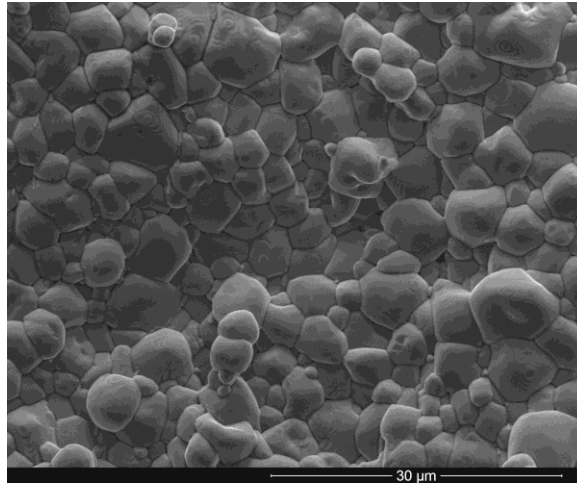




Ferroperm™ Piezoelectric Pz54



Dedicated materials for the HIFU industry

The new Ferroperm Pz54 have very high permittivities, high mechanical Q_m values, and low dielectric losses. It is therefore the optimum choice for applications, where the highest power levels are required in combination with the smallest possible volume. The material were developed to meet the challenges dictated by the rapid development in ultrasonic assisted surgery and therapeutics.

Repeatable performance

The main focus through our entire production process is to provide materials and components with the highest possible reproducibility of properties and parameters and to obtain the lowest aging rates in the industry.

Our materials have a variation of $\pm 5\%$ for all parameters. This reduces the requirements for impedance matching, frequency tuning and dimensioning of the housing meaning fewer rejects and lower costs.

Customised solutions

We have more than 60 years of experience in the production of advanced piezoelectric ceramics. Our team has extensive expertise in customising designs to match the customer's needs.

Please contact us to discuss your requirements in further detail.

Key benefits

- Lowest batch to batch variation in the industry
- Stable material with consistent performance
- Customised or standard designs

Key features

- High operating temperature
- High permittivities
- High mechanical Q_m values
- Low dielectric losses

Applications

- Highly specialised HIFU transducers
- Ultrasonic assisted surgery and therapeutics

Contact

CTS Ferroperm

Porthusvej 4, DK-3490
Kvistgaard
Denmark
Tel: +45 49 12 71 00

e-mail: pz@ctscorp.com

www.ferropermpiezoceramics.com



Ferroperm™ Piezoelectric Pz54

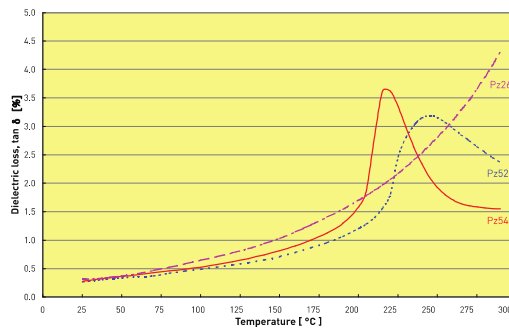
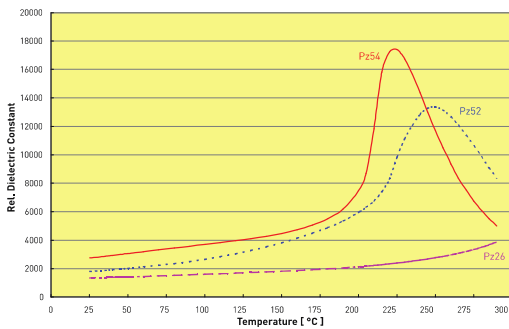
Material properties

Electrical	Symbol	Pz54	Pz26
Relative dielectric permittivity at 1 kHz	K_{33}^T	2800	1300
Dielectric dissipation factor at 1 kHz	$\tan \delta$	3×10^{-3}	3×10^{-3}
Curie temperature	$T_C >$	220 °C	330 °C
Recommended working range	<	130 °C	230 °C
Electromechanical			
Coupling factors	k_p	0.56	0.57
	k_t	0.48	0.47
Piezoelectric charge coefficient	d_{33}	460 pC/N	290 pC/N
Frequency constant, thickness	N_t	1980 Hz m	1550 Hz m
Mechanical			
Mechanical Quality Factor	$Q_{m,t}^E$	1500	1000
Density	ρ	7.8 g/cm ³	7.8 g/cm ³

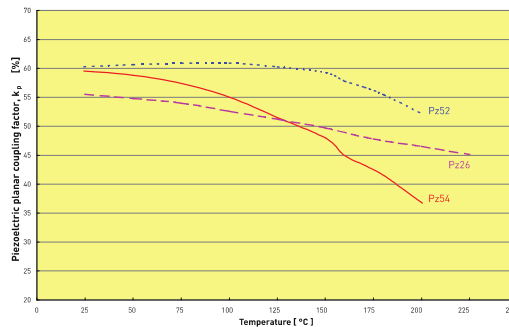
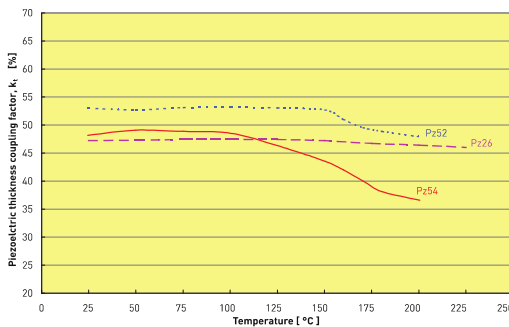
Note: Due to continuous process improvement, specifications are subject to change without notice.

PZ26 is a traditional high power material

Please be aware that extreme dimensions and geometries can lead to exaggeration in tolerances in all materials.



Temperature dependence of the free dielectric constant, ϵ_r (left) and dielectric loss tangent, $\tan \delta$ (right) of Pz52 and Pz54 in comparison with a traditional Type 100 high-power material (Pz26). A very moderate and linear increase in both parameters can be observed in the recommended working range from room temperature to 180-200°C. It is worth noting, that $\tan \delta$ for both Pz52 and Pz54 is lower than in Pz26 at temperatures as high as 200°C.



Temperature dependence of the thickness coupling constant k_t (left) and planar coupling constant k_p (right) in Pz52 and Pz54 in comparison with a traditional Type 100 high-power material (Pz26). The coupling coefficients are very stable, and at high level within the entire recommended temperature range from room temperature to 180-200°C.