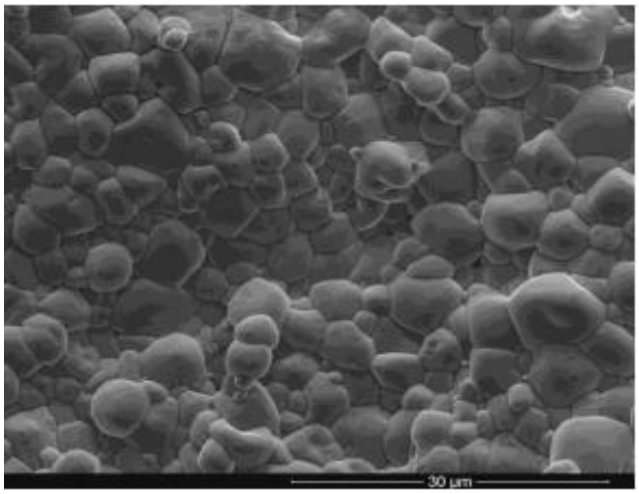
Ferroperm Piezoceramics

Your Partner in Smart Solutions

DATA SHEET

HIFU type PZT

Type Pz54



Microstructure of Pz54 at a magnification of 5000 times

01 Description

The new Ferroperm Pz54 have very high permittivities, high mechanical Qm 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 ±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.

02 Key features and benefits

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

- High operating temperature
- High permittivities
- High mechanical Qm values
- Low dielectric constant

03 Applications

- Highly specialized HIFU transducers
- Ultrasonic assisted surgery and therapeutics

04 Contact

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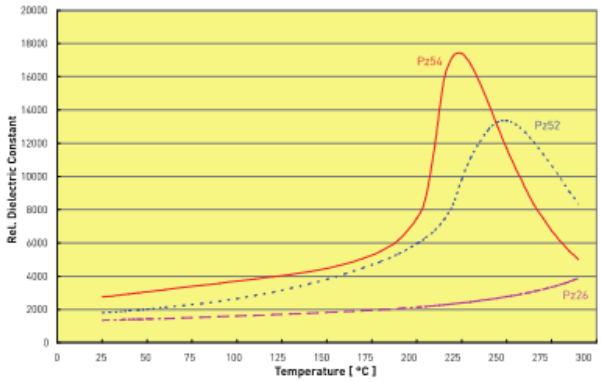
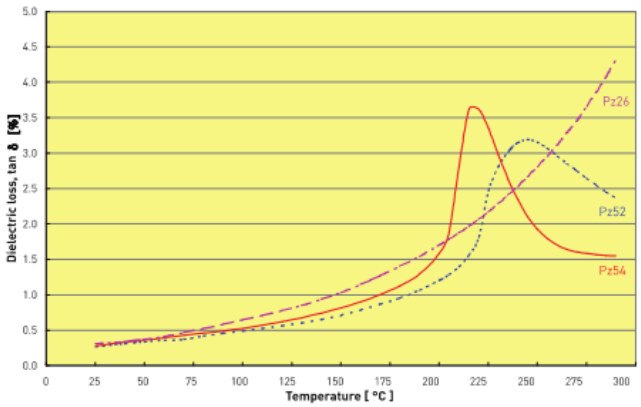
05 Material properties

Electrical	Symbol	Pz54
Relative dielectric permittivity at 1 kHz	K_{33T}	2800
Dielectric dissipation factor at 1 kHz	tanδ	3 x 10^{-3}
Curie temperature	T_C >	220 °C
Recommended working range	<	130 °C
Electromechanical		
Coupling factors	k_p	0.56
	k_t	0.48
Piezoelectric charge coefficient	d_{33}	460 pC/N
	N_t	1980 Hz m
Mechanical		
Mechanical Quality Factor	$Q_{m,t}^{E}$	1500
Density	ρ	7.8 g/cm3

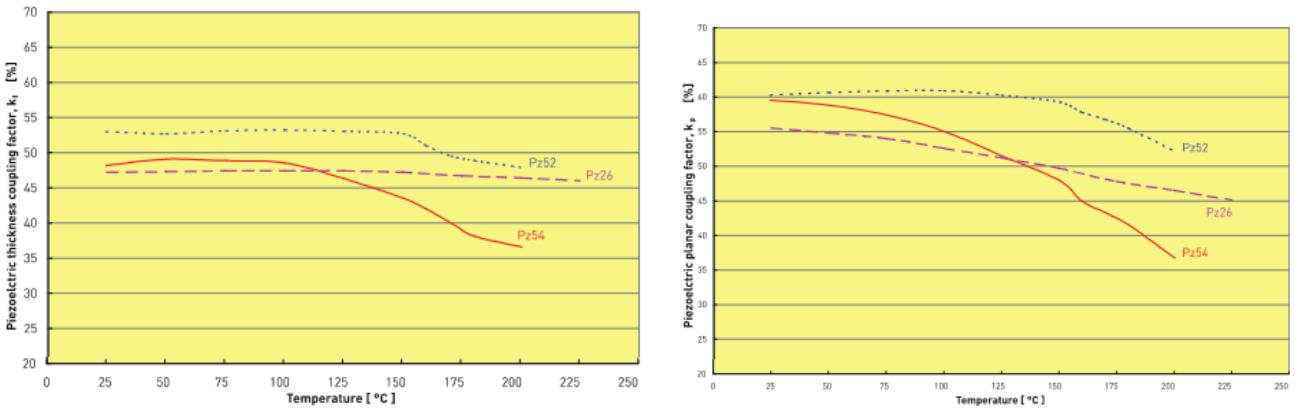
Note: Due to continuous process improvement, specifications are subject to change without notice.
Please be aware that extreme dimensions and geometries can lead to exaggeration in tolerances in all materials.

06 Technical performance





Temperature dependence of the free dielectric constant, er ,(left) and dielectric loss tangent, tand, (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 tand for both Pz52 and Pz54 is lower than in Pz26 at temperatures as high as 200°C



Temperature dependence of the thickness coupling constant kt (left) and planar coupling constant kp (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.