

NCE51F



Noliac piezoceramic material NCE51F is a variant of NCE51 and it will generally be used in Noliac's standard range for multilayer actuators $\geq 150V$.

SPECIFICATIONS

Properties	Symbol & unit	NCE51 NCE51f
DIELECTRIC PROPERTIES (tolerances +/- 10%)		
Relative Dielectric Constant	$\epsilon_{T_{33}} / \epsilon_0$	1900
Dielectric Loss Factor	$\text{tg}\delta [10^{-4}]$	150
Dielectric Loss Factor at 400V/mm	$\text{tg}\delta [10^{-4}]$	
ELECTROMECHANICAL PROPERTIES (tolerances +/- 5%)		
Electromech. Coupling Factors**	k_p	0.65
	k_{31}	0.38
	k_{33}	0.74
	k_t	0.50
Piezoelectric Charge Constants	$-d_{31} [10^{-12} \text{ C/N}]$	208
	$d_{33} [10^{-12} \text{ C/N}]$	443
Piezoelectric Voltage Constants	$-g_{31} [10^{-3} \text{ Vm/N}]$	13
	$g_{33} [10^{-3} \text{ Vm/N}]$	26
Frequency Constants	$N^E_p [\text{m/s}]$	1925
	$N^D_t [\text{m/s}]$	2000
	$N^E_1 [\text{m/s}]$	1370
	$N^D_3 [\text{m/s}]$	1320
PHYSICAL PROPERTIES (tolerances +/- 5%)		
Mechanical Quality Factor	Q_m	80
Density	$\rho [10^3 \text{ kg/m}^3]$	7.85
Elastic Compliances	$s^E_{11} [10^{-12} \text{ m}^2/\text{N}]$	16
	$s^E_{33} [10^{-12} \text{ m}^2/\text{N}]$	19
Curie Temperature	$T_c [^\circ\text{C}]$	360

** Measured in accordance with standard EN 50324

The values listed are for reference purposes only and cannot be applied unconditionally to all shapes and

dimensions. Values vary depending on the actual shape, surface finish, shaping process and post-processing of the product.