

WEIFANG JUDE ELECTRONIC CO.,LTD.

----- A Possible Long Term Partner

***Plant of* Piezo Ceramic**

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JUDE Piezo Ceramic (Shandong Location) ----

Military Research & Factory Supplier background

Quartz

LiNbO₃

PMN-PT

PZT

PMN

PNA(N5622)

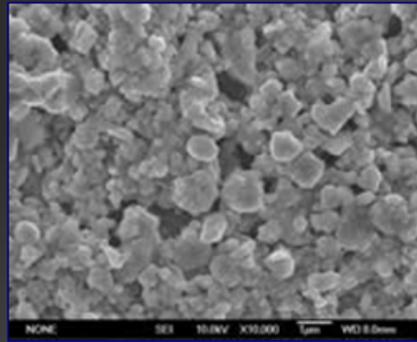
PT

BaTiO₃

HT(Bi₄Ti₃O₁₂)

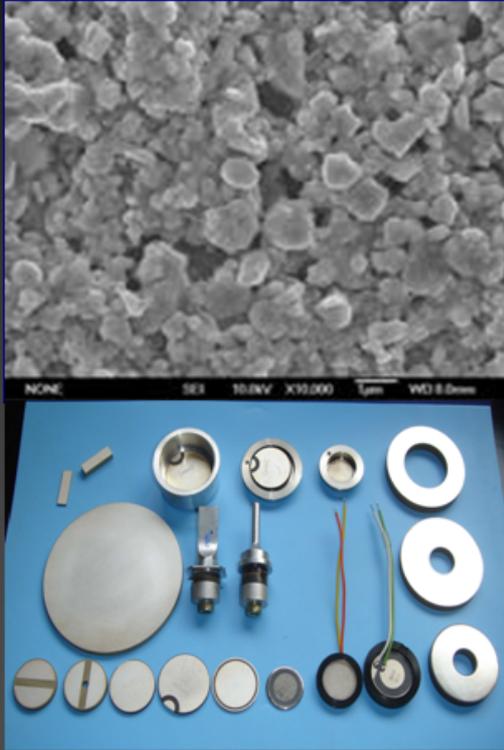
K81

K85



Piezo Ceramic Materials

The Base for our Piezo component



- PZT
- PMN-PT
- PT
- BaTiO_3
- $\text{Bi}_4\text{Ti}_3\text{O}_{12}$
- PLZT

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Developed according to customers' requirements.

Basic Piezoceramic Materials Datasheet (PZT)

Material types		BaTiO3	PZT-2	PZT-4			PZT-8	PZT-5				
Properties	Items	BT-1	PZT-2	PZT-4A	PZT-4D	PZT-4E	PZT-8	PZT-5A	PZT-5B	PZT-5J	PZT-5H	PZT-5X
Dielectric constants	ϵ_{33}/ϵ_0	1500	560	1150	1300	1650	1000	1800	2300	2800	3200	4400
Dissipation factor[%]	$\tan \delta$	0.50	0.40	0.50	0.50	0.50	0.20	1.50	1.50	1.30	1.10	1.50
Coupling coefficients	K_p	0.35	0.54	0.58	0.60	0.62	0.57	0.62	0.62	0.65	0.72	0.72
	K_{33}			0.69	0.71	0.70	0.68	0.71	0.72	0.72	0.76	0.78
	K_{31}			0.33	0.33	0.35	0.34	0.34	0.35	0.38	0.40	0.40
Piezoelectric charge constants[pC/N]	d_{33}	150	230	300	320	400	280	450	480	550	640	760
	d_{31}			-120	-145	-140	-105	-175	-210	-258	-283	-322
Piezoelectric	g_{33}	11.4	39	23.5	31.7	24.5	31	28.2	24.5	20.7	21.1	19.1
Voltage constants [X10 ⁻³ V/m/N]	g_{31}			-11.5	-12.8	-10.5	-11.9	-11	-10	-9.6	-9.3	-8.2
Mechanical Q	Q_m	2000	1600	600	800	400	800	60	60	80	60	60
Frequency constants [Hz/M]	N_i	2680		2050	2010	2015	2090	2150	2100	2160	2200	2210
	N_p	3160		2235	2180	2120	2330	2020	1990	1900	1950	1975
	N_{31}			1600	1560	1650	1670	1400	1420	1400	1400	1450
Elastic constants [X10 ¹⁰ N/m ²]	Y_{11}^E			7.9	7.5	7.8	8.6	6	7.4	5.9	6	6.1
	Y_{33}^E			6.6	6.2	6.4	7.1	5.3	5	4.8	4.3	4.3
Poisson's ratio		0.30	0.32	0.33	0.35	0.30	0.33	0.35	0.35	0.35	0.34	0.35
Curie temperature[°C]	T_c	110	310	320	310	300	310	310	305	280	250	185
Density [g/cm ³]	ρ	5.70	7.60	7.74	7.73	7.50	7.73	7.72	7.74	7.65	7.60	7.60

Piezo Elements

■ Sensor Crystals

- Knock Sensor
- Pressure Sensor
- Accelerometer
- Others

■ Medical Crystals

- Ultrasonic Imaging
- Micro Pump
- Others

■ Transducer Crystals

- Ultrasonic Cleaner
- Welding Stack
- Humidifier
- Underwater Acoustic
- Others

■ Others

- Igniters
- Type-casting Parts
- Custom Products

Piezo Ultrasound

Ultrasonic Cleaner

Welding

Beauty

Fog

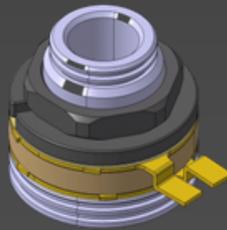
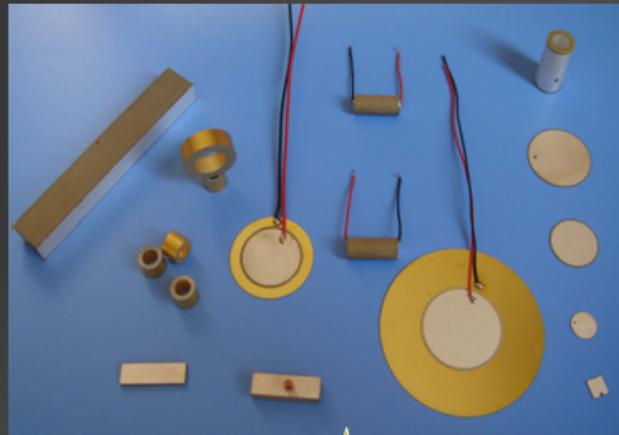


Application



Shear & Compression Plates

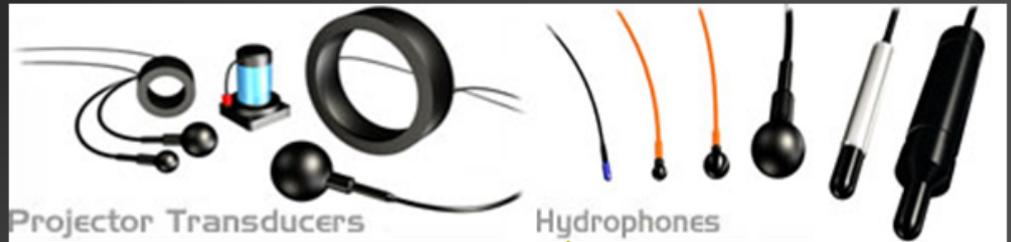
- Shear & Compression type Accelerometer
- Pressure & High Temp. Sensor
- Vibration/knock Transducer
- Doppler flow meters
- Sound Element and others



Application

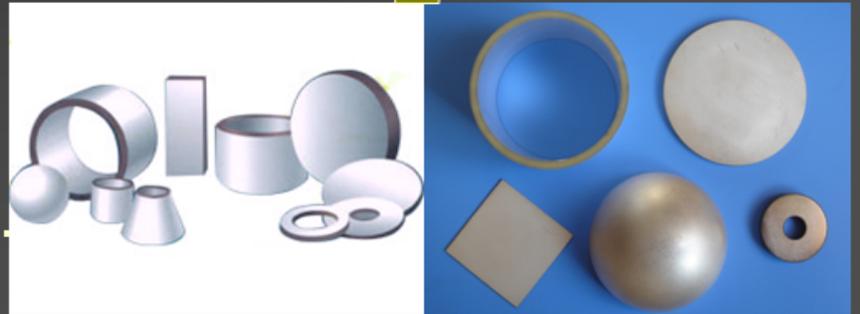
Piezo Ultrasonic

- Underwater, Military, Medical

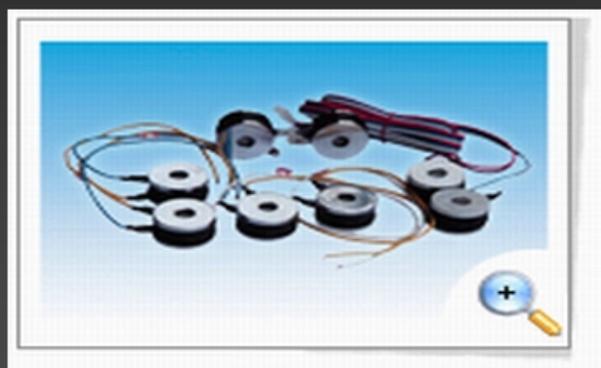


- Fish finder
- Hydrophones
- Projector Transducers
- Underwater Acoustics transducers
- NDT transducers (Transmitter/Receiver)
- High-Power & low Freq. Transducers

Application



Piezo ceramics for motive balancers



- Applied in producing tire balancers
- Stability, consistency, accurate measuring
- Wire: 0.25m, 0.70m, 1.2m, 2.6m
- Quick delivery

Piezoceramic Process (Powder Preparing)



1. Raw material weigh in as each type material directions for producing chemicals or metallurgical products
2. Put into this big stove for full mixturing
3. After testing discs approved, this lot Powder can be entered into mass production.

Piezoceramic Process (Shape)



automatic type



Half-automatic type

Before this process, the pressure data and pressure time for this lot parts should be calculated by Head Engineer.

Piezoceramic Process (Sinter)



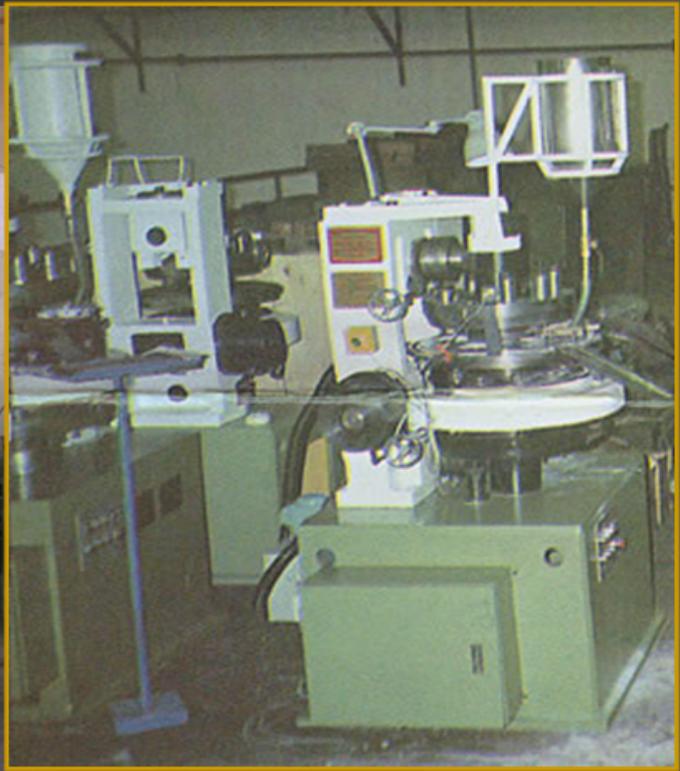
Temperature Control
& Records Workroom

24 hours control

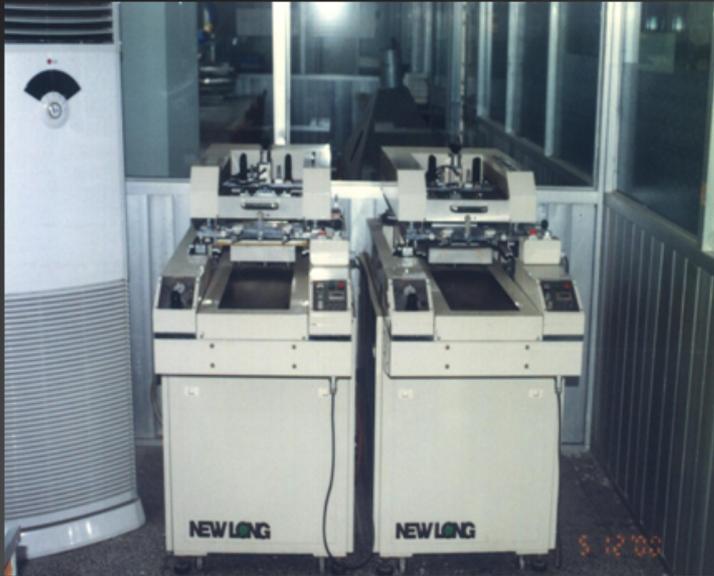


Tunnel Stove

Piezoceramic Process (Machining)



Piezoceramic Process (Electrode Printing & Firing)



Piezoceramic Process (Poling)



Voltage Controller desk

Pole device & High Voltage Generator

Piezoceramic Process (Testing)



D33 Tester

Capcitanace and
Loss

Frequency and
Impedance
Analyser

Mission

Manufacturer of Full Range Piezo Ceramics

OEM partner with High Quality & competitive price

Enlarge Focus on **Automotive, Marine & Medical Application**

Service Policy:

High Quality

Reasonable Price

Best Services

Piezo Ceramic Organization Chart

- Total 65
- Engineers 15
- R&D/Support 6

- Sales 7
- QC 3
- ADM 4

Capability for Piezo Element Manufacturing

- 0.5M pcs monthly Small discs
- 0.3M-0.4M pcs monthly ultrasonic Clearing/Welding Ring
- 0.3M pcs monthly Sensor Crystal element ,but it could be increase immediately.
- Others

Anything can we do for you?

Thank you!!!