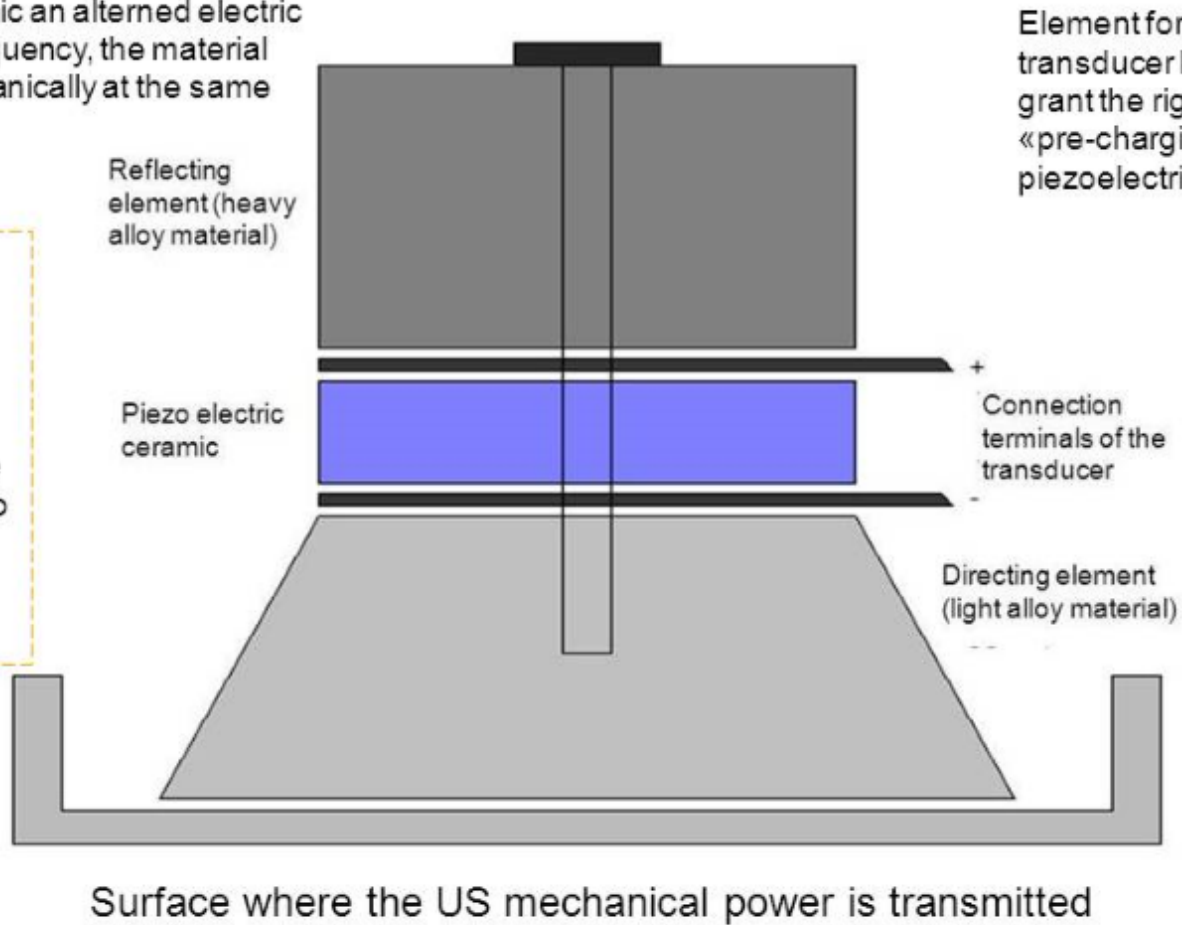


SOME INFO ABOUT PIEZO ELECTRIC TRANSDUCERS...

US piezoelectric transducer: a typical structure

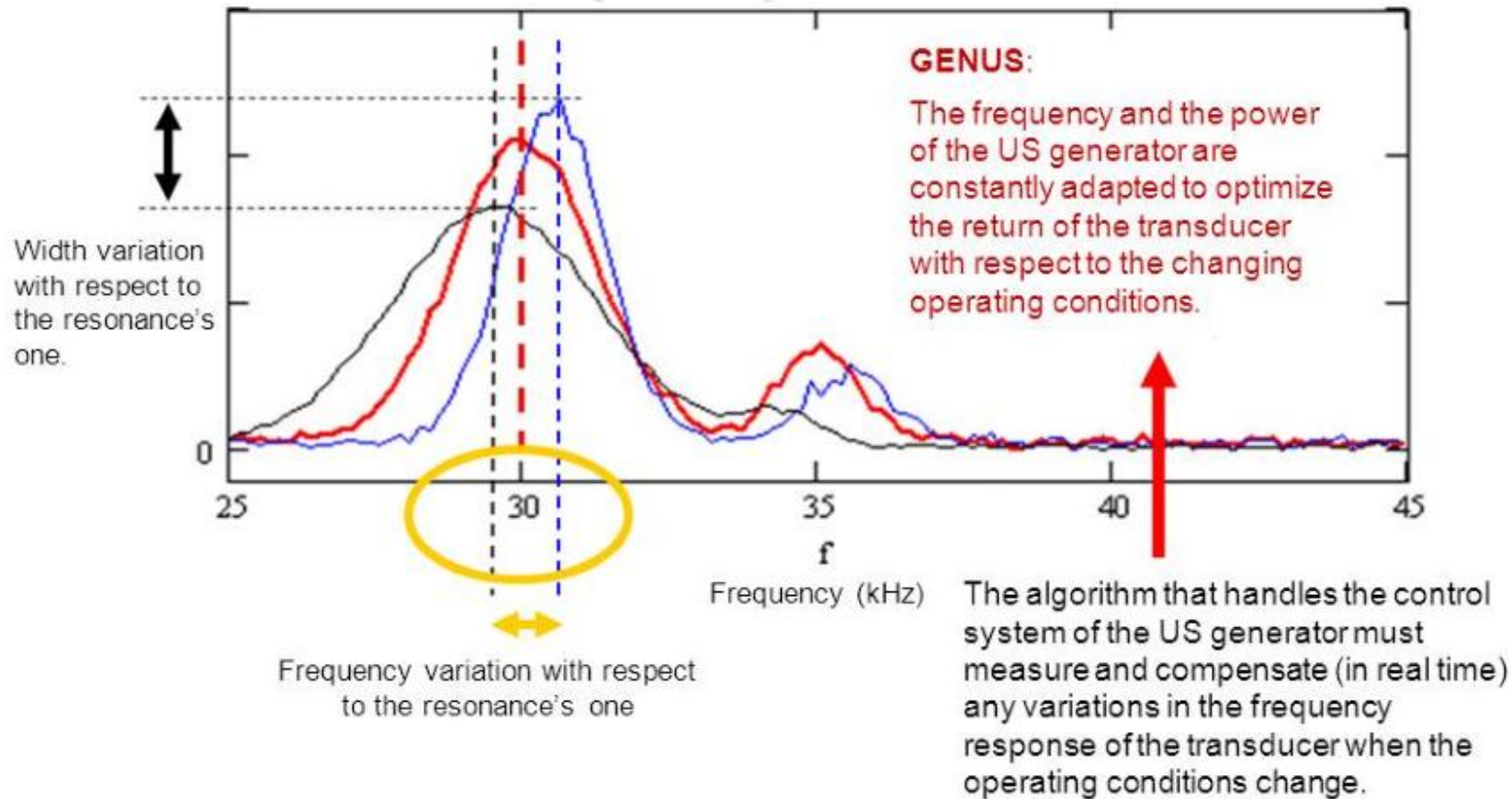
PIEZOELECTRIC Effect: applying to the piezoelectric ceramic an altered electric field of suitable frequency, the material will resonate mechanically at the same frequency.

Mechanical US vibration of the piezoelectric ceramic when excited by an electric field whose frequency is near to the one of the transducer resonance.



The characteristics of the piezo electric transducers **vary** depending on the construction tolerances, of the operating mode (load conditions), of the temperature and the aging (inner wearing out of the piezo electric ceramics).

Frequency response of the piezo electric transducer



The transducers are the devices that convert a physical quantity to another: thanks to the use of **piezoelectric** materials, made with special ceramics, it is possible to transform *an oscillation of electric potential into a mechanical vibration*, which retains the same frequency of the excitation signal. The physical amplitude of the vibration (the movement of the material) is imperceptible, but the intensity can be very high if you are operating in resonance conditions. This requires an appropriate design of the **transducers depending on the application**.

In fact, a very important feature of the piezoelectric transducers concerns the selective nature of their frequency response: the device must be "*tuned*" with the generator, to optimize the efficiency at the resonance frequency of the system generator – transducer - mechanical load. This frequency depends in a complex way by many interacting variables such as the applied mechanical load, the temperature, the conditions of use and the gradual aging of the materials. These factors affect the transducer working point even during operation: it is therefore necessary to foresee *an automatic system to compensate these variations*, "forcing" the generator to **"follow" the resonance of the system**. Moreover, it is imperative to adapt the maximum efficiency of the *output circuit of the power generator* with the peculiar characteristics of the transducer used.

We have developed, for internal use, the measurement system **GENUS_Spectrum** to study, characterize and optimize the response of any of your piezoelectric transducer (or array of transducers) working within the frequency band from 22 to 60 kHz, optimizing their driving with our GENUS modules.

Measurement system GENUS_Spectrum, with which we optimize the driving of your transducers with our electronics



Typical array of piezoelectric transducers used in ultrasound washing

