

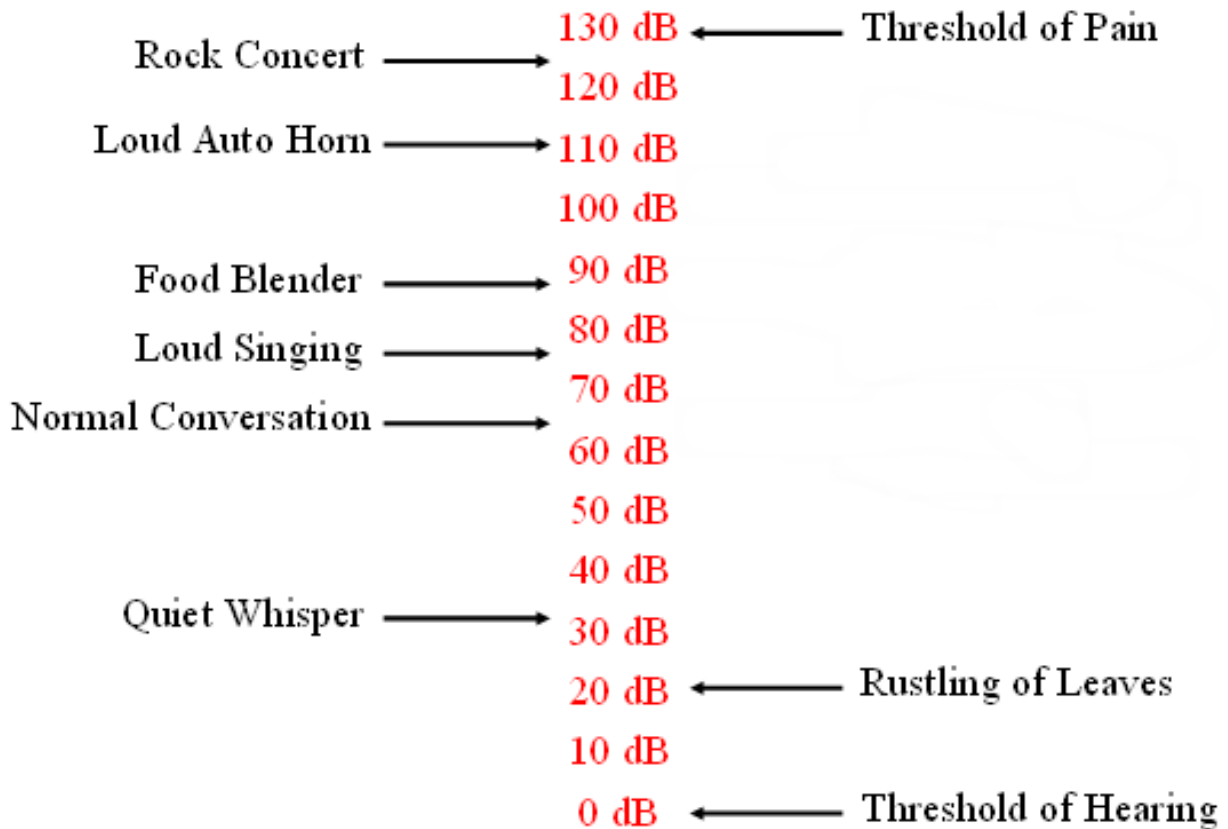
Product Application Guide- Indicators- Electromagnetic

Decibel Sound Level Scale

The decibel sound level scale is an arbitrary scale that ranges from 0 dB (threshold of hearing) to 130 dB (threshold of pain). The chart below shows where some common sounds fall on this dB scale. Audible alarms are available that have sound levels as soft as 55 dB at 2 feet and as loud as 110 dB at 2 feet.

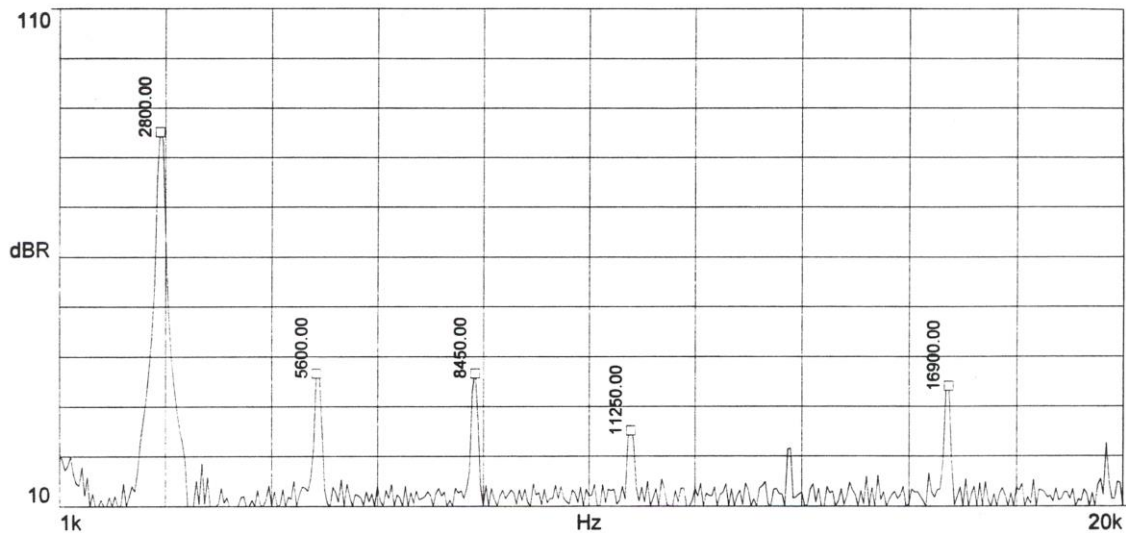
Reference Sound Levels

(as if you were standing 2 feet from the sound source)



Fundamental Frequency & Harmonics

Below is a frequency scan of a piezoelectric audible alarm that has a resonant frequency of 2,800 Hz. As you can see, there is a strong frequency peak at 2.8 kHz and several smaller frequency peaks that follow called harmonic frequencies. The table below the chart shows that the size of the harmonic frequencies are significantly smaller than the fundamental frequency for this particular alarm unit. Because this alarm has a large fundamental frequency and much smaller harmonic frequencies, the sound quality of this part will be very good. When this alarm is activated, the listener will hear one clear frequency (also called sound pitch) from the alarm. Other electronic alarm technologies such as electro-magnetic or electro-mechanical type alarms often have much larger harmonic frequency components resulting in less clear tone.



| | Frequency | dB | % dB of Fundamental |
|---------------|------------|------|---------------------|
| Fundamental: | 2.800 KHz | 86.1 | 100.0% |
| 2nd Harmonic: | 5.600 KHz | 37.6 | 43.7% |
| 3rd Harmonic: | 8.450 KHz | 37.6 | 43.7% |
| 4th Harmonic: | 11.250 KHz | 26.1 | 30.3% |

Tube and Tape-n-Reel Counts- All P/N's

| Part Number | Tube Count | Reel Count |
|---------------|------------|------------|
| ASI301Q | 35 | |
| ASI301TRQ | | 250 |
| ASI401Q | 35 | |
| ASI401TRQ | | 250 |
| AST100Q | 25 | |
| AST100TRQ | | 500 |
| AST1109MLTRQ | | 1000 |
| AST1240MLTRQ | | 1000 |
| AST1440MATRQ | | 600 |
| AST1575BMATRQ | | 300 |
| AST1628MATRQ | | 800 |
| AST1750MATRQ | | 400 |
| AST200Q | 48 | |
| AST200TRQ | | 1000 |
| AST501Q | 35 | |
| AST501TRQ | | 450 |
| AST605Q | 35 | |
| AST605TRQ | | 300 |

| Part Number | Tube Count | Reel Count |
|---------------|------------|------------|
| AST612Q | 35 | |
| AST612TRQ | | 450 |
| AST7525MATRQ | | 1000 |
| PB-1220PQ | 40 | |
| PB-1221PQ | 40 | |
| PB-1224PE-05Q | 40 | |
| PB-12N23P-01Q | 40 | |
| PB-12N23P-03Q | 40 | |
| PB-12N23P-05Q | 40 | |
| PB-12N23P-12Q | 40 | |

Typical Failure Modes of Piezoelectric Audible Alarms

| Component/Subsystem | Failure Mode | End Result | Occurrence |
|--|---|--|--------------------------------|
| Circuit Components (Resistors, Capacitors, Diodes, IC's, etc.) | Over-voltage by customer's application | Unit ceases working. | Vast Majority of Returns |
| Transducer/Wire Solder Operation | Not enough wire strands in solder joint | Wire breaks after period of time & unit ceases sounding | Rare |
| Physical Assembly | Transducer wire pinched, adhesive/epoxy run down onto transducer, or RTV adhesive seal failure | Intermittent operation | Rare |
| Soldering Operation | Incorrect Solder Temperature or Time Causing Cold Solder Joint | Intermittent operation or unit ceases working after period of time | Very Rare |
| Circuit Components | Random Component Failure; Wrong Component Used; Missing Component | Unit ceases working under normal operating conditions | Very Rare |
| Transducer Wire | Defect in Wire; Wire Strands Damaged in Production | Wire breaks after period of time & unit ceases sounding | Very Rare |
| Piezo Transducer | Incorrect Polarization by Manufacturer; Glue Bonding Failure | Sound volume level decreases over time. | Exceedingly Rare |

Notes:

1. Customer returns of Mallory audible alarms for failure to operate are very rare. Of the few parts returned each year, the vast majority of the root cause of failure is an over-voltage or voltage spike condition caused by the customer's application.
2. All Mallory alarms are, at a minimum, function tested 100% during production, and a final audit is performed. Mallory SC/SBM/SBT/SBS/SNP/LSC/VSB/MSR/MSO/ZA series of alarms are audited 100% at final test by checking that sound level, frequency, and current are within specification limits from 2 to 4 different voltage levels.