12 things to consider

When selecting an industrial accelerometer

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#1 Acceleration range

- Most industrial applications utilize a sensor with an 80 g or 50 g acceleration range
  - 80 g sensors provide a broader dynamic range of measurement
  - 50 g sensors may clip the signal, resulting in sensor overload, if the amplitude of vibration extends beyond the acceleration limit

#2 Reliable signal over the life of the sensor

- Many physical characteristics contribute to accurate sensor data over the long-term
  - Piezoelectric stabilization of the PZT crystal minimizes signal drift over time
  - True hermetic seal (verified by helium leak testing) protects internal components from outside contaminants
  - Case materials made from 316L stainless steel for ruggedness
- Can the manufacturer provide Mean Time Between Failure data?

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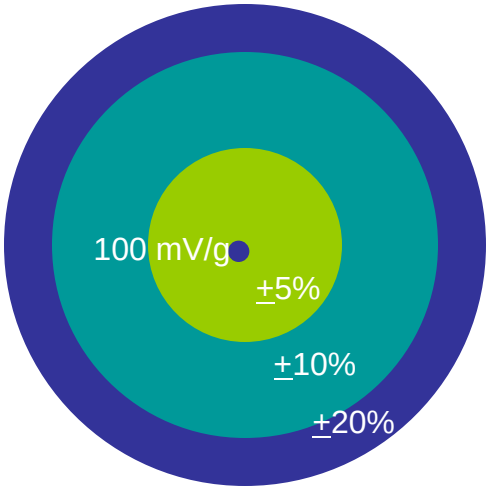
#3 Sensitivity tolerance



- Typical sensitivity tolerances range from 5% to 20%
  - A tight ±5% tolerance is the best
  - A wider ±10-20% tolerance can be used when the exact sensitivity value can be programmed into the data acquisition equipment
  - Tolerances are most important if your data collector or online system does not easily allow changing sensitivities for individual accelerometers

#4 What you get is what you expect

- Make sure the sensor meets the specifications on the data sheet
  - Some data sheets quote guaranteed specifications, while many give “typical” specifications that your sensor may not meet
  - Have confidence that the performance of the product meets the advertised specifications
  - Especially important for frequency response and noise specifications

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#5 Acceleration versus velocity

- Acceleration and velocity sensors monitor for different faults
  - Velocity sensors are used for the majority of applications because velocity is the best overall indication of machinery health for both low speed and high speed components
  - Acceleration is useful for monitoring gear mesh frequencies and early warning signs of bearing failure
  - Both sensor outputs are available with a variety of options: top or side exit, a range of sensitivities and tolerances, integral cabling, and hazardous area certifications, to name a few

#6 Hazardous area certifications

- Vibration sensors are available with hazardous area certifications commonly found in industrial settings, such as Intrinsically Safe Class I Division1 / Zone 0, Class I Division 2 / Zone 2, and Explosion Proof ratings

#7 Resonance frequency

- Resonance frequency can mask developing faults if it is not far enough from the signal of interest: 30 kHz is usually adequate

#8 Temperature range

- The temperature where the accelerometer will be installed determines the type of accelerometer you choose
  - Standard industrial accelerometers with built in electronics are limited to 248° F (120° C)
  - High grade components enable some sensors to reach 302° F (150° C)
  - ‘Charge mode’ accelerometers, which do not contain internal electronic circuitry, typically operate up to 500° F (260° C)
  - Special high temperature sensing elements enable operation at temperatures as high as 1400° F (760° C), however these units present other trade offs in the industrial environment, so it is important to balance temperature requirements with factors such as price and ruggedness

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#9 Integral cabling

- All integral cables are not created equally
  - Ceramic to metal headers separate the internal sensor parts from the cable to keep all moisture and contamination out of the sensor.
  - Testing at only the specification pressure level can mask a fracture; for deep under water applications, sensor testing should include cycling to expand fractures
  - Deep under water applications should employ a cable with insulation that reduces damage to the cable if water does enter it
  - Special consideration should be given to the cable/boot interface to make certain moisture does not penetrate the sensor through the boot assembly

#10 Isolation and shielding

- The sensor and cable design should protect the signal from environmental factors which can corrupt the data
  - Shielded cable is required with the shield terminated at the enclosure (not the sensor) to avoid ground loops and static charge build up
  - Sensors should be designed to withstand ESD (electro-static discharge) up to 20,000 Volts, however this specification is not typically listed on data sheets and should be requested of the manufacturer
  - Mounting pads can be purchased to provide isolation protection (up to 1,500 Volts) in environments when there may be high voltage potential differences, high static charge build up, or uncertain grounding conditions

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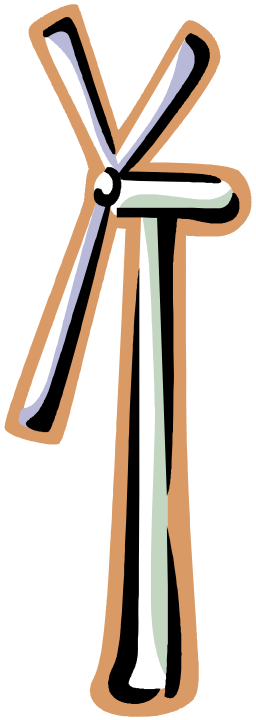
#11 Measurement range



- 100 mV/g sensors are most commonly used to monitor industrial rotating equipment, but there are exceptions
  - 10 mV/g sensors for high-g applications such as high speed turbines or monitoring second and third harmonics of gear mesh frequencies
  - 500 mV/g sensors for low frequency applications such as monitoring wind turbine blades or slow moving machinery in cooling towers

#12 Technical support

- Given the number of important considerations in accelerometer selection, technical support from the manufacturer and a knowledgeable sales team are critical to selecting the correct accelerometer for your application

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Thank you! Please contact us with any questions

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