GLOSSARY OF TERMS

Acceleration Compensation
A design incorporating components within the sensor to cancel the effect of motion (vibration) on the sensor output signal.

Acceleration Sensitivity
In a pressure transducer or impulse hammer, this refers to the unwanted output signal from the sensor in response to vibration in the sensitive axis of the sensor. This parameter is specified in terms of psi/g for pressure sensors and Lbs/g for impulse hammers. Certain Dytran sensors such as the Series 2200 and 2300 pressure sensors and the Dynapulse™ series of impulse hammers are acceleration compensated to minimize this effect.

Charge Mode
Sensors which contain piezoelectric crystals but no built-in electronics. These sensors may use quartz or piezoceramics to generate electrostatic charge signals in response to input measurands.

Current Source Power Unit
A power supply expressly designed for use with Low Impedance Voltage Mode (LIVM) sensors consisting of an energy source (batteries or DC power supplies) and a constat current element. These units are characterized by stable constant current output and high dynamic impedance. They also serve as signal decoupling devices.

Discharge Time Constant (TC)
The time required for the output voltage from a sensor or system to discharge to 37% of its original value in response to a zero rise time step function input. This parameter determines low frequency response.

Fault Monitor Meter
A DC Voltmeter incorporated into LIVM power units to read the DC voltage at the output of the current source. If a sensor is connected, the meter reads the sensor bias voltage and can be used to indicate open and shorted cables and sensors or to verify normal system operation.

Frequency Response
The highest and lowest frequencies at which measured deviations from a reference sensitivity (usually 100 Hz) lie within a specified error. The deviations are usually specified as -5%, but in some cased -3dB is specified.

LIVM
Low Impedance Voltage Mode, Dytran's Trademark describing its line of piezoelectric sensors with built-in impedance converting electronics.

Linearity
Actually the non-linearity or deviation from a straight line in a plot of output amplitude vs. input amplitude of a sensor or system. At Dytran, we use the popular zero based best straight line method of determining linearity. Full scale is determined, a zero based best straight line plot of output vs. input is made, an error band is created using a specified percent of full scale. All points on the curve must fall within this error band.

Mass Loading
The change in actual sensitivity of a back-to-back accelerometer when loaded with masses significantly different from the transfer standard with which it was originally calibrated. Correction curves of actual sensitivity vs. frequency are referred to as "mass loading correction curves".

Normalization
See "Standardization".

Phase Shift
The difference in phase angle between input measured and output electrical signal, measured in degrees. The response may lag or lead the input.

Picocoulomb
A measure of electrostatic charge output from piezoelectric sensors.
1 Picocoulomb= 1 x 10^{-12} Coulomb.

RMS
Root Mean Square. In AC theory, this is the "heating value" of an AC waveform and it is equal in amplitude to .707 times the peak value of the waveform. Most AC meters are calibrated to read in RMS. To obtain the peak value of the waveform, multiply the RMS value by 1.414.

Resonant Frequency
Also called "natural frequency". The lowest frequency of a second order system (spring-mass system) which satisfies the solution to the differential equation of motion.

$$f_n = \frac{1}{2\pi}\sqrt{\frac{k}{M}}$$

At this frequency, the amplitude increases by factors of as much as 100. The useable upper frequency of a sensor is determined by this parameter. All sensors are spring-mass systems with intrinsic natural frequencies

Rise Time
The time required for a sensor or system to respond to an instantaneous input step function, measured from the 10% to 90% points on the response waveforms.

Sensitivity
The scale factor of a sensor or system, measured in terms of change in output signal per change in input measured. Accelerometer sensitivity is expressed in terms of mV or pC/g, pressure sensor sensitivity is expressed in terms of mV or pC/psi and force sensor sensitivity is expressed in terms of mV or pC/LbF.

Sensor Bias
When LIVM sensors are supplied with constant current, a DC voltage bias exists at the center conductor of the sensor connector. The output signal is superimposed on this DC bias. The power unit extracts the signal from this bias by various means, effectively "blocking" it. The normal range for this voltage is +9 to +12 volts.

Standardization
As applied to systems, refers to the application of gain or attenuation as needed to correct the sensitivity of a sensor to the exact nominal (or design) sensitivity. As applied to sensors, refers to the process by which the sensor sensitivity is brought close to the nominal value. In specification sheets, it is the highest acceptable deviation of the measured sensitivity from the nominal value, expressed in percent.

Transient Thermal Response
The time history of the change in output (voltage or charge) from a sensor resulting from a sudden change in ambient temperature.

Transverse Sensitivity
The output of an accelerometer in response to motion in directions orthogonal to its sensitive axis, expressed as a ratio of measured output to cross axis input, in percent.

Thermal Coefficient of Sensitivity
The measured change in the sensitivity (of scale factor) of a sensor, from its room temperature (reference) value to the value at a higher or lower stabilized ambient temperature. This parameter is measured in percent of change in sensitivity per degree of temperature deviation.

Triboelectric Noise
The unwanted generation of electrical charges by the chafing together of insulation layers inside electrical cables during flexing caused by vibration and shock induced motion.

Zero Shift
The change in baseline level of the output voltage of an accelerometer immediately after a mechanical shock.