

Environment	Typical Equipment to be Protected	Sources of Vibration-Shock-Noise	Other Destructive or Deteriorative Conditions
<b>General Industrial Equipment</b> <b>Business Machines</b> Computers & Accessories. Typewriter. Copy Machine. Medical Equipment. Test Equipment	Memory drums. Electronic Components. Structure of machine (Reduce fatigue). Personnel in the surrounding areas (noise reduction).	Motors. Fans & blowers. Air Compressors. Pumps. Transportation Handling.	Oil. Chemicals. Fluids.
<b>Recreational Vehicles</b> Boats. Snowmobiles. Golf Carts. Trail Bikes. Motorcycles. Motor Homes.	Passenger (safety & comfort). Structure of vehicle (reduce fatigue). Personnel in the surrounding areas (noise reduction). Communication equipment.	Power plant. Choppy waters. Rough terrain.	Oil. Sunlight. Ozone. Humidity. Salt Spray.
<b>Farm Equipment</b> Tractors. Harvesters. Planters. Spreaders.	Passenger (safety & comfort). Structure of vehicle (reduce fatigue). Personnel in the surrounding areas (noise reduction). Communication equipment. Mechanical, electrical, hydraulic, and pneumatic operating components.	Power plant. Rough terrain. Accessory equipment.	Oil. Sunlight. Ozone. Humidity.
<b>Truck &amp; Construction Equipment</b> On-highway. Off-highway.	Passenger (safety & comfort). Structure of vehicle (reduce fatigue). Personnel in the surrounding areas (noise reduction). Communication equipment. Mechanical, electrical, hydraulic, and pneumatic operating components.	Engine. Normal road shock. Off-road terrain.	Heat and cold. Humidity. Lubricants. Chemicals, hydraulic fluids, etc. Sunlight and ozone.
<b>Industrial Machinery</b>	Metal forming or cutting equipment, presses, brakes, shears, hammers, grinders, compressors.	Impact operations. Accessory equipment. Motors. Pumps.	Oils. Chemicals.
<b>AIRCRAFT</b> <b>Commercial</b> Piston Engine.	Flight recorder. Radar. Radios. Air data recorder. Gyroscopes. Instrument panels. Radar antennae. Antenna couplers. Instruments, indicators, gages, etc.	Propulsion system (Warm-up & Flight). Air turbulence. Landing impact. Taxiing. Amplified vibration caused by structural resonances.	Temperature & humidity extremes. Altitude. Chemical action of hydraulic fluids, fuels, lubricants. Sunlight and ozone.
Jets and turboprops.	Flight recorder. Radar. Radios. Air data recorder. Gyroscopes. Instrument panels. Engine pressure ratio transducers. Radar antennae. Antenna couplers. Instruments, indicators, gages, etc.	Propulsion system. Air turbulence. Landing impact. Taxiing. Amplified vibration caused by structural resonances.	Temperature and humidity extremes. Altitude. Chemical action of hydraulic fluids, fuels, lubricants. Sunlight and ozone.
<b>Military &amp; Other High Performance Aircraft</b> Piston engine.	Flight recorder; .Air data recorder. Radar; Radios. Gyroscopes; Instrument panels. Engine pressure ratio transducers. Radar antennae; Antenna couplers. Instruments, indicators, gages, etc. Electronic countermeasures equipment. Fire control radar & computers. Bomb racks & sights. Cathode ray display tubes. Integrated avionics packages.	Propulsion system (Warm-up & Flight) Air turbulence. Landing impact. Taxiing. Amplified vibration caused by structural resonances. Gunfire.	Temperature and humidity extremes. Altitude. Chemical action of hydraulic fluids, fuels, lubricants. Sunlight and ozone. Salt Spray. Fungus. Sand and dust.

Applicable Specifications and Typical Vibration, Shock, Noise Input Level	Desirable Isolator Characteristics	Applicable Barry Isolators or Systems
Operating speeds of the disturbing sources. Determined by structural conditions and location of equipment within structures.	Low natural frequency (5 to 15 Hz) Low cost. Facilitate installation.	WR/WB Ring & Bushing Series; Ball Mounts. Cupmounts; 6300, 6550 Series. Industrial Machinery Mounts; 633A Series 500 Series; 500SL Series; HR Series; 22000 Series; Barry-Bond Series; Industrial Conical Mount Series. ME Series; TTA & TTB Series. Lo-G Casters
Operating speeds of power plant. Typical shock input 8 to 10 g's. or greater.	Low natural frequency (5 to 15 Hz) Low cost. Facilitate installation. Provide cushioned bottoming.	WR/WB Ring & Bushing Series; Ball Mounts. Cupmounts; 5200 Series; 6300, 6550 Series. 500 Series; 500SL Series; HR Series; 22000 Series; Barry-Bond Series; Industrial Conical Mount Series. SLM Series
Operating speeds of power plant. Typical shock input 2 to 5 g's.	Low natural frequency (5 to 15 Hz). Low cost. Facilitate installation. Provide cushioned bottoming.	Cupmounts; 5200 Series; 6300, 6550 Series. 500 Series; 500SL Series; HR Series; 22000 Series; Barry-Bond Series; Industrial Conical Mount Series. SLM Series.
Function of vehicle suspension, road & terrain condition.	Attenuate high frequency road & terrain shock and transient vibrations.	WR/WB Ring & Bushing Series. Cupmounts; 5200 Series; 6300, 6550 Series. 500 Series; 500SL Series; HR Series; 22000 Series; Barry-Bond Series; Industrial Conical Mount Series. VHC Series; SLM Series. ME Series; TT-A & TT-B Series.
Operating speeds of the disturbing sources. Determined by structural conditions & the location of equipment within structures. OSHA requirements.	Low natural frequency (5-15 Hz) Low cost. Facilitate installation.	Industrial Machinery Mounts; 633A Series. 30005 Series Neoprene Pads. Serva-Level <sup>®</sup> ; SLM Series.
Airframe & Component Manufacturer's Specifications. Typical Vibration Input: 5-55 cps - .060" D. A. 55-500 cps - 10 g Typical shock Input: 15 g - .011 sec. 30 g - .011 sec. (Crash safety).	Natural frequency 5-15 cps. Maximum isolation efficiency. Low amplification at resonance. Minimum rotational coupling. Minimum shock output. Minimum sway space. Minimum size and weight. Electrical grounding. Designed to ensure equipment survival.	L-Mounts; S-Mounts 500 Series; 500 SL Series; 22000 Series; Barry-Bond Series. Cable Mounts ME Series; TTA & TT-B Series Special High-Performance Mounts.
Airframe & Component Manufacturer's Specifications. Typical Vibration Input: 5-55 cps .060" D. A. 55-2000 cps 10 g. Typical shock Input (half-sine): 15 g - .011 sec. 30 g - .011 sec. (Crash safety).	Natural frequency 10-25 cps. Operable at commercial jet climb & maneuver attitudes. Maximum isolation efficiency. Low amplification at resonance. Minimum rotational coupling. Minimum shock output. Minimum sway space. Minimum size and weight. Electrical grounding. Designed to ensure equipment survival	B-Mounts; T-Mounts; Cupmounts 5200 Series; E21/E22 Series; 6300/6550 Series. 500 Series; 500SL Series; HR Series; 22000 Series; Barry-Bond Series. ME Series; TTA & TTB Series. Special High-Performance Mounts.
MIL-E-5400; MIL-E-5272; MIL-STD-810 Typical Vibration Input: 5-10 cps .080" D. A. 10-15 cps .41 g. 15-75 cps .036" D. A. 75-1000 cps 10 g. Typical Shock Input: 15 g - .011 sec. 30 g - .011 sec. (crash safety). MIL-C-172: Transmissibility (max) at 23 cps T<1.00 at 30 cps T<.35 at 500 cps T<.20	Natural frequency 10-25 cps. All attitude performance for combat aircraft. Maximum isolation efficiency. Low amplification at resonance. Minimum rotational coupling. Minimum shock output. Minimum sway space. Minimum size and weight. Electrical grounding. Designed to ensure equipment survival	S-Mounts; L-Mounts; B-Mounts; T-Mounts; Cupmounts. 5200 Series, E21/E22 Series; 6300/6550 Series. Cable Mounts. ME Series; TTA & TTB Series Special High-Performance Mounts.

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Jet transports and bombers.	Flight recorder; Air data recorder. Radar; Radios. Gyroscopes; Instrument panels. Engine pressure ratio transducers. Radar antennae; Antenna couplers. Instruments, indicators, gages, etc. Electronic countermeasures equipment. Fire control radar & computers, Bomb racks & sights, Cathode ray display tubes, Integrated avionics packages.	Propulsion system. Air turbulence. Landing impact. Taxiing. Amplified vibration caused by structural resonances. Gunfire.	Temperature and humidity extremes. Altitude. Chemical action of hydraulic fluids, fuels, lubricants. Sunlight and ozone. Salt Spray. Fungus. Sand and dust.
Jet fighters, interceptors, attack bombers, Special-mission aircraft.	Radar; Radios. Air data recorder. Gyroscopes; Instrument panels. Engine pressure ratio transducers. Radar antennae; Antenna couplers. Instruments, indicators, gages, etc. Electronic countermeasures equipment. Fire control radar and computers. Bomb racks and sights. Integrated avionics packages. Photographic and other optical equipment.	Propulsion system. Air turbulence. Landing impact. Taxiing. Amplified vibration caused by structural resonances. Gunfire.	Temperature and humidity extremes. Altitude. Chemical action of hydraulic fluids, fuels, lubricants. Sunlight and ozone. Salt spray. Fungus. Sand and dust.
Carrier based.	Flight recorder. Radar; Radios. Air data recorder. Gyroscopes; Instrument panels. Engine pressure ratio transducers. Radar antennae; Antenna couplers. Instruments, indicators, gages, etc. Electronic countermeasures equipment. Fire control radar and computers. Bomb racks and sights. Integrated avionics packages. Photographic and other optical equipment.	Propulsion system. Air turbulence. Landing impact. Amplified vibration caused by structural resonances. Gunfire. Catapult take-offs. Arrested landings.	Temperature and humidity extremes. Altitude. Chemical action of hydraulic fluids, fuels, lubricants. Sunlight and ozone. Salt spray. Fungus. Sand and dust.
<b>Helicopters</b>	Radar; Radios. Gyroscopes; Instrument panels. Radar antennae; Antenna couplers. Instruments, indicators, gages, etc. Integrated avionics packages. Fire control equipment	Propulsion system. Rotor. Landing impact. Amplified vibration caused by structural resonances. Gunfire.	Temperature and humidity extremes. Altitude. Chemical action of hydraulic fluids, fuels, lubricants. Sunlight and ozone. Salt spray; Sand and dust. Fungus.
<b>ROCKETS, MISSILES, AND SPACE VEHICLES</b>	Telemetry; Electronics. Fuel lines. Relay boxes, Arming and fusing systems Electronics. Antennae; Antenna couplers. Instruments, indicators, gages, etc., Instruments panels. Structural members. Photographic and other optical equipment.	Propulsion system. Separation of booster stages. Re-entry deceleration. Amplified vibration caused by structural resonances.	Temperature and humidity extremes. Altitude. Chemical action of hydraulic fluids, fuels, lubricants. Sunlight and ozone. Special handling. Transport. Storage and service environmental conditions.

Applicable Specifications and Typical Vibration, Shock, Noise Input Level	Desirable Isolator Characteristics	Applicable Barry Isolators or Systems
<p>MIL-E-5400; MIL-E-5272; MIL-STD-810  Typical Vibration Input:  5-10 cps .080" D. A.  10-15 cps .41 g.  15-75 cps .036" D. A.  75-1000 cps 10 g.  Typical Shock Input:  15 g - .011 sec.  30 g - .011 sec. (crash safety).  MIL-C-172 (general reference for size &amp; hardware requirements).</p>	<p>Natural frequency 10-25 cps.  All attitude performance.  Maximum isolation efficiency.  Low amplification at resonance.  Minimum rotational coupling.  Minimum shock output.  Minimum sway space.  Minimum size and weight.  Electrical grounding.  Designed to ensure equipment survival  Note: Isolator characteristics are a function of use &amp; location in airframe. Most severe vibration from high speed. Low level flight is dense, turbulent air.</p>	<p>T-Mounts; B-Mounts; Cupmounts.  5200 Series; E21/E22 Series; 6300/6550 Series.  Cable Mounts.  ME Series; TTA &amp; TTB Series.  Special High-Performance Mounts.</p>
<p>MIL-E-5400; MIL-E-5272; MIL-STD-810.  Typical Vibration Input:  5-10 cps .080" D. A.  10-15 cps .41 g.  15-75 cps .036" D. A.  75-1000 cps 10 g.  Typical Shock Input:  15 g - .011 sec.  30 g - .011 sec. (crash safety).  <b>Note:</b> Vibration &amp; shock input levels vary widely; usually specified by airframe &amp; component manufacturers.  MIL-C-172 (general reference for size &amp; hardware requirements).</p>	<p>Natural frequency 10-25 cps.  All attitude performance.  Maximum isolation efficiency.  Low amplification at resonance.  Minimum rotational coupling.  Minimum shock output.  Minimum sway space.  Minimum size and weight.  Electrical grounding.  Designed to ensure equipment survival.  <b>Note:</b> Isolator characteristics are a function of mission of aircraft and performance parameters to which equipment is subjected.  Example: extreme sustained acceleration.</p>	<p>T-Mounts; B-Mounts; Cupmounts.  5200 Series; E21/E22 Series; 6300/6550 Series.  Cable Mounts.  ME Series; TTA &amp; TTB Series.  Special High-Performance Mounts.</p>
<p>MIL-E-5400; MIL-E-5272; MIL-STD-810.  Typical Vibration Input:  5 - 10 cps - .080" D. A.  10 - 15 cps - .41 g.  15 - 75 cps - .036" D. A.  75 - 1000 cps - 10 g.  Typical Shock Input:  15 g - .011 sec.  30 g - .011 sec. (crash safety).  <b>Note:</b> Vibration &amp; shock input levels vary widely; usually specified by airframe &amp; component manufacturers. Landing shocks can be as severe as 12 g, .125 sec.)  MIL-C-172 (general reference for size &amp; hardware requirements).</p>	<p>Natural frequency 10-25 cps.  All attitude performance.  Maximum isolation efficiency.  Low amplification at resonance.  Minimum rotational coupling.  Minimum shock output.  Minimum sway space.  Minimum size and weight.  Electrical grounding.  Designed to ensure equipment survival.  <b>Note:</b> Isolator characteristics are a function of mission of aircraft and performance parameters to which equipment is subjected.  Example: extreme sustained acceleration.</p>	<p>T-Mounts; B-Mounts; Cupmounts.  5200 Series; E21/E22 Series; 6300/6550 Series.  Cable Mounts.  ME Series; TTA &amp; TTB Series.  Special High-Performance Mounts.</p>
<p>MIL-E-5400; MIL-E-5272; MIL-STD-810.  Airframe and Component Manufacturers' Specifications.  Typical Vibration Input:  5 - 20 cps .100" D. A.  20 - 32 cps 2 g.  32 - 72 cps .036" D. A.  72 - 500 cps 10 g.  Typical Shock Input:  15 g - .011 sec.  30 g - .011 sec. (crash safety).  MIL-C-172 (general reference for size &amp; hardware requirements).</p>	<p>Natural frequency 5-15 cps.  Maximum isolation efficiency.  Low amplification at resonance.  Minimum rotational coupling.  Minimum shock output.  Minimum sway space.  Minimum size and weight.  Electrical grounding.  Designed to ensure equipment survival.</p>	<p>H-Mounts.  5200 Series; E21/E22 Series.  HTTA Series.  Cable Mounts.  SLM Series.  Specially-designed isolation systems to meet severe vibration inputs.</p>
<p>Specifications established by Systems Contractor.  Vibration inputs up to .50" D. A.  Sustained acceleration as high as 1000 g.</p>	<p>All attitude performance.  Maximum isolation efficiency.  Low amplification at resonance.  Minimum rotational coupling.  Minimum shock output.  Minimum sway space.  Minimum size and weight.  Electrical grounding.  Designed to ensure equipment survival.</p>	<p>T-Mounts; B-Mounts; Cupmounts.  5200 Series; E21/E22 Series; 6300/6550 Series.  Cable Mounts.  Special High-Performance Mounts.</p>

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<b>MARINE</b> <b>Naval</b> Surface vessels and submarines.	Engines; Generators. Navigation and communications gear; Radar; Sonar. Plotting boards. Fire control and guidance equipment. Missile and ammunition storage. Radar antennae, etc. Hydrophones; Gyrocompasses. Instruments, indicators, gages, etc. Automatic control and logging systems.	Power plant. Heavy seas. Gunfire. Near misses. Depth charges. Pumps. Engine generators.	Salt spray. Oil. Humidity. Fungus. Sunlight and ozone.
<b>Merchant</b>	Engines; Generators. Navigation and communications gear. Radar; Sonar. Plotting boards. Radar antennae, etc. Instruments, indicators, gages, etc. Automatic control and logging systems.	Power plant. Heavy seas. Pumps. Engine generators.	Salt spray. Fungus. Humidity. Oil. Sunlight and ozone.
<b>General Marine and Small Boats</b>	Navigation and communications gear. Sonar; Radar. Engines; Generators. Instruments, indicators, gages, etc.	Power plant. Outboard motors. Pumps. Heavy seas. Engine generators.	Salt spray. Fungus. Humidity. Oil. Sunlight and ozone.
<b>VEHICLES</b> <b>Trucks</b>	Cargo and passengers. Indicators and controls. Mechanical, electrical, hydraulic, pneumatic operating components. Communications equipment.	Engine. Normal road shock. Off-road terrain.	Heat and cold. Humidity. Lubricants. Chemicals, hydraulic fluids, etc. Sunlight and ozone.
<b>Military Vehicles</b> Tanks, Trucks and Jeeps.	Cargo and passengers. Indicators and controls. Mechanical, electrical, hydraulic, pneumatic operating components. Communications equipment. Fire control equipment.	Engine. Normal road shock. Off-road terrain. Gunfire.	Heat and cold. Humidity. Fungus. Lubricants. Chemicals, hydraulic fluids, etc. Sunlight and ozone. Sand and dust.
<b>Military Transportable Shelters</b>	Shelters for Military field systems such as: Communications centers. Aircraft control centers. Medical aid stations, etc. Equipment within shelters.	Air to ground transfer (18" free fall helicopter cable to ground). Rough handling, dragging, etc.	Temperature extremes. High humidity. Fungus. Salt spray. Oils and chemicals. Sunlight and ozone.
<b>BUILDINGS</b> Laboratories. Quality Control Departments. Fabrication Areas.	Spectrometers. Electron microscopes. Precision measuring equipment. Optical and Mechanical vibration test equipment.	Compressors. Air Conditioners. Elevators. Motor and rail traffic. Personnel walking. Natural seismic.	Air turbulence. RF interference. Temperature extremes.
<b>PACKAGING</b> <b>Re-Usable Containers and Shipping Pallets</b>	Usually sensitive electronic, mechanical, or optical equipment such as: Computers. Gyroscopes. Office copiers. Radios. Radar. Laboratory equipment. Missiles.	Handling. Air, sea, truck and train transport.	Heat and cold. Humidity. Fungus. Lubricants. Chemicals. Sunlight and ozone. Sand and dust.