APPROXIMATE FRAGILITY LIMITS FOR TRANSPORTATION SHOCK

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Excerpt from Reference 1

15 G's or less

Some inertial guidance platforms and space vehicles.

<u> 16 – 24 G's</u>

Missile guidance systems, precision aligned test equipment, gyros, and some inertial guidance platforms.

<u> 25 – 39 G's</u>

Mechanically shock-mounted instruments (shock mounts secured prior to packaging provided for in-service use only), vacuum tube electronics equipment.

<u>40 – 59 G's</u>

Aircraft accessories such as constant speed drives; electric typewriters, most solid state electronics equipment, oscilloscopes, computer components.

<u>60 – 84 G's</u>

TV receivers, aircraft accessories such as generators, starters; some solid state electronics equipment, some circuit cards and some terminal boards.

<u>85 – 110 G's</u>

Refrigerators, appliances, some electromechanical equipments, some circuit boards, air duct hoses, attenuators, cable assemblies, some capacitors, gears, housings, receivers, couplers, some resistors, some terminal boards.

<u> 110 + G's</u>

Machinery, aircraft structural parts such as landing gear, control surfaces, hydraulic equipment, washers, latch pins, plates, screw brackets, bushings, gaskets, cable assemblies, some capacitors, coupling cover drive discs, fittings, some resistors, rings, rollers, shafts, supports.

Excerpt from Reference 2

Acceleration (G)	Description	Example
0 - 20	Extremely Sensitive	Precision instruments with mechanical suspension.
20 – 40	Very Sensitive	Instruments and electronic equipment in stiff frames, needle-suspended instruments, navigation equipment, Cathode ray tubes, light bulbs.
40 - 60	Sensitive	Electro-mechanical equipment, cashier machines, cooling equipment fridges, relays.
60 – 85	Moderately Sensitive	Radio and TV, optical equipment, electronic machines and measurements instruments, domestic appliances.
85 - 110	Relatively Insensitive	Glass, porcelain, accumulators, heat exchangers.
110 - 200	Insensitive	Machines, motors, transformers, bottles.

References

- 1. MIL-STD-2073, Department of Defense Standard Practice for Military Packaging, 1999.
- Effektiva tågsystem för godstransporter- Underlagsrapport -Noise and vibration aspects on railway goods transportation (Teknik för mindre buller och vibrationer) Rapport 0506E, Ulf Carlsson Järnvägsgruppen KTH Marcus Wallenberg Laboratoriet, 2003-07-02.