

SCANIVALVE CORP TEST PLAN VIBRATION and SHOCK

Reference Documents

MIL-STD-810E, Method 514.4 and Method 516.4
NASA ADFRF 21-2

Vibration

- 1) The EUT(Equipment Under Test) will be tested in separate tests to each of the three perpendicular axes of the EUT.
- 2) The EUT shall be tested in the configuration in which it will be used, if possible. If the EUT is to be mounted on Vibration Isolators, It should be tested using the isolators. If the EUT is to be tested with and without isolators, then the vibration levels should be adjusted when the isolators are removed.
- 3) The EUT shall be tested using Sine and Random Vibration. Test interruptions are permitted. The test clock will be stopped during interruptions.

Sine Vibration

- 1) The EUT shall be tested with one complete up and down sweep in each axis. The total time for the sweep shall be 15 minutes. Resonant frequencies shall be recorded. A resonance dwell test of a minimum of two minutes shall then be performed at each resonant frequency.
- 2) The Sine Vibration Test Curves are shown in Figure 1. The curve selection shall be based on Table 1.
- 3) Operation of the EUT shall be monitored and recorded throughout the test.

Random Vibration

- 1) The EUT shall be tested for 2 hours in each axis or for the expected duration of the vibration activity during normal use. The minimum time will be 20 minutes in each axis.
- 2) The test curve shall be selected from Figures 2 and 3 based on Table 2.
- 3) Operation of the EUT shall be monitored and recorded throughout the test.

Shock

- 1) The EUT shall be subjected to three shocks in each direction in each axis for a total of six shocks in an axis.
- 2) Each shock will be a half sine wave pulse over the frequency range of 5 to 2000 hertz. The pulse width shall be 11 ms.
- 3) The level of the shock test will be determined by the vibration test requirements. Shock tests may exceed the random vibration test levels. Recommended levels may be found in Table 3.
- 4) Operation of the EUT shall be monitored and recorded throughout the test. Operation is not required during crash shock tests. Crash test levels will be determined on a "per test" basis.
- 5) When the EUT is tested for crash test shocks, the EUT does not have to remain operational. The purpose of crash shock tests it to insure that the EUT does not break apart and become a missile.

| CURVE | APPLICATION |
|-------|--|
| A | Equipment normally installed on vibration isolators, but tested with rigid mounting. |
| B | 1) Equipment mounted in fuselage forward of CG - not in engine compartment 2) Equipment mounted aft of CG - not in engine compartment 3) Equipment mounted in inboard half of wing semi-span - engine not wing mounted |
| C | 1) Equipment mounted in same section of the fuselage as the engine 2) Equipment mounted in wing outboard semi-span 3) Equipment mounted in wing in which engine is mounted |
| D | Equipment mounted inside the engine compartment, engine pylon, or fan case |
| E | Equipment mounted directly on the engine |
| F | Equipment mounted in power operated rudders, elevators or ailerons |

Table 1 - Sine Vibration Test Curve Selection

| CURVE | APPLICATION |
|-------|--|
| A | Equipment normally installed on vibration isolators, but tested with rigid mounting. |
| B | 1) Equipment mounted in fuselage forward of CG - not in engine compartment 2) Equipment mounted aft of CG - not in engine compartment 3) Equipment mounted in inboard half of wing semi-span - engine not wing mounted |
| C | 1) Equipment mounted in same section of the fuselage as the engine 2) Equipment mounted in wing outboard semi-span 3) Equipment mounted in wing in which engine is mounted |
| D | Equipment mounted inside the engine compartment, engine pylon, or fan case |

Table 2 - Random Vibration Test Curve Selection

| Test Condition | Peak Acceleration | Pulse Width |
|----------------|-------------------|-------------|
| Operating | 6 g's | 11 ms |
| Non-Operating | 15 g's | 11 ms |

Table 3 - Shock Test Selection

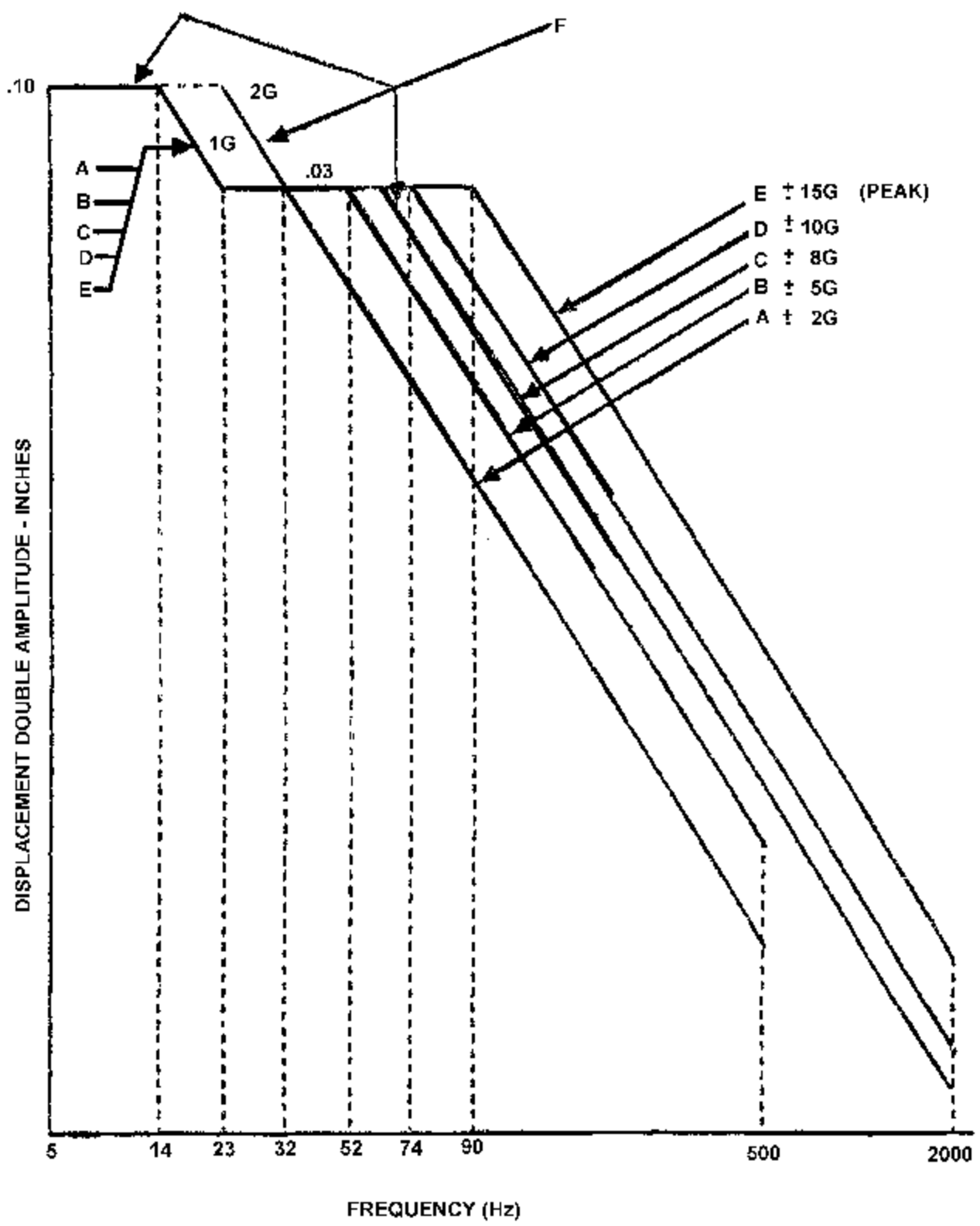


Figure 1 - Sine Vibration Test Curves

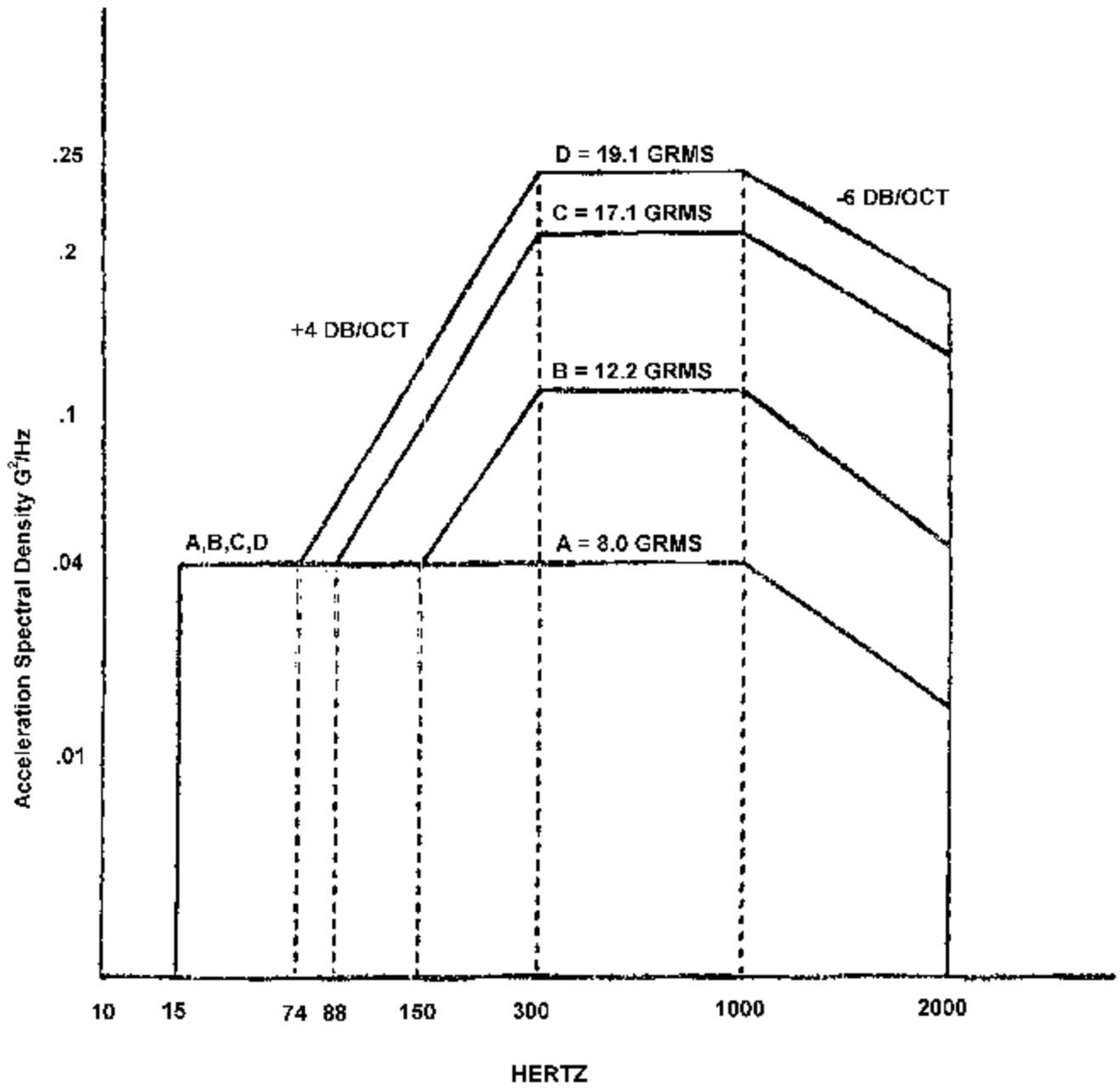


Figure 2 - Random Vibration Test Curve Selection

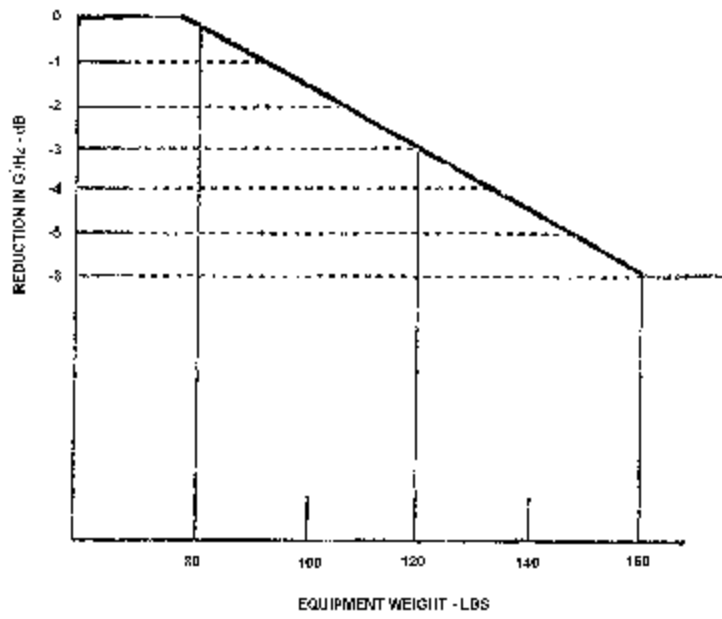


Figure 3 - Load Reduction Factor