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**Design, Test, and Evaluation Division
Recommended Practice 026.1**

TEST-RP-DTE026.1

Using MIL-STD-810(F), 519 Gunfire

INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY

1827 Walden Office Square, Suite 400 |
Schaumburg, IL 60173 USA
Phone: (847) 981-0100 • Fax: (847) 981-4130
E-mail: iest@iest.org • Web: www.iest.org



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1 SCOPE AND LIMITATIONS

1.1 Scope

This Recommended Practice (RP) is intended to provide guidelines for component and structure testing for significant response to exposure to gunfire. It is organized to supplement guidelines provided in MIL-STD-810F and to provide for realistic testing practices for gunfire environments. A substantial portion of this RP assumes that the gunfire response environment has been measured and that representative time history traces are available.

The first three procedures representing recommended practices, under "The Pulse Method," have no prediction parameters and in general are not considered parameterizable procedures. These procedures are based upon the laboratory replication of measured equipment response to gunfire.

The fourth procedure, under "The Random Vibration Method," assumes the prediction method of MIL-STD-810E is applicable in cases in which 1) measured data are not available, and 2) the response to gunfire would not represent a significant environment (i.e., the equipment is far from the pressure pulse emanating from the gun and isolated from the structure-borne vibration caused by the gun). This procedure attempts to specify the environment for the many complex situations whereby multiple guns are firing at several rates, and the contributions for precise analysis are difficult to categorize. In this case, equipment response may be considered, for practical purposes, to be high-level random vibration. Through use of certain signal processing tech-

niques, such as synchronous sampling, information on response from individual guns may be detected, provided the gunfiring rate is known and deterministic. Data in this area are currently unavailable, and this processing goes beyond that discussed in this RP. Finally, this RP, along with the procedures, may apply to other pulse form response environments, such as propeller-oriented environments, that are not addressed here.

1.2 Limitations

MIL-STD-810B through MIL-STD-810E are built upon a parameterization of gunfire vibration based on gun parameters and configurational geometry. The first three procedures described here are non-parametric in nature. Because of the high degree of response pulse repeatability, these procedures provide for very accurate laboratory replication of response for a particular configuration, but provide no method for modifying parameters of a model for the response for other configurations.

In cases where multiple guns are firing at different rates in a complex configuration, the response is likely to be very random in nature at a high level. In this case, The Pulse Method viewed as a transient vibration is recommended upon examination of the general spectral character of the vibration.

This RP is limited to "ordinary" cases of gunfire and exposure of components to gunfire. Cases in which the response to the pressure pulse environment may exceed electrodynamic shaker or electrohydraulic shaker limitations have not been addressed and require specially designed tests. Cases where large components are exposed to gunfire, and spatial