

“HAPPY NEW YEAR 2013”



from **Met-L-Chek®** and the Penetrant Professor



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“Stuff You Need to Know”

John Brausch, of the U. S. Air Force, has released a draft of suggested requirements for the approval of **UV-A** lamps to be used in NDT inspection. The draft addresses several key points regarding the **UV-A** sources, each of which is important for reliable inspection. Important points are as follows:

1. The wave length of the emitted **UV-A** must be the optimum for producing the brightest indications,

2. The **UV-A** irradiance must be above the minimum for good inspection ($1000\mu\text{W}$ at 15 inches) and below the intensity that will cause the indications to fade at reasonable working distances.

3. The irradiance at the inspection surface must be uniform over a reasonable area,

4. The emission of visible light must be minimized so as not to produce glare that will interfere with seeing indications.

5. Battery characteristics on battery powered sources must be such that the emission irradiance is not degraded while the source is in use.

The following are excerpts from this draft or condensations of some of the more detailed paragraphs.

1.1 This practice covers the procedures and requirements for testing the performance of **UV-A** lamps used in fluorescent penetrant and fluorescent magnetic particle testing of hardware used for aerospace applications. This practice includes test procedure to assess **UV-A** lamps emission characteristics when performance of these tests, by the producer, is specified.

1.2 This practice is only applicable for **UV-A** lamps used in the examination process for aerospace hardware. This practice is not applicable to lamps used in initial processing (e.g. penetrant application stations, rinse stations, etc.). This practice is also not applicable to fiber or liquid filled light guides used in special inspection applications (e.g. bore-scope light sources).

UVA sources listed include Medium pressure mercury vapor (**MPMV**) lamps, Micro discharge lamps (**MDL**), Light emitting diode (**LED**) sources, portable dispatch lamps, hand-held booth lamps, and overhead lamp fixtures.

5.1 UV-A lamps are used in fluorescent and magnetic particle examination processes to excite dyes/pigments to maximize the contrast and detection of surface and near-surface discontinuities. The fluorescent dyes/pigments absorb the

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energy from the **UV-A** radiation and re-emit light energy in the visible spectrum. This energy transfer allows fluorescence to be observed by the human eye.

5.2 The emission characteristics of **UV-A** lamps greatly affect the efficiency of dye/pigment fluorescent excitation.

5.3 High Intensity **UV-A** lamps produce irradiance greater than 10,000 $\mu\text{W}/\text{cm}^2$ at 38.1 cm (15 in.). High intensity **UV-A** light sources can cause fluorescent dye fade and increase exposure of the inspector's unprotected eyes and skin to high levels of damaging radiation.

5.4 UV-A lamps, if not properly filtered, can emit visible radiation 380nm – 750nm. Visible light contamination must be controlled to minimize reflected glare and maximize inspection contrast.

6.1 UV-A lamps for use in examination of aerospace hardware shall be of the following types and classes:

Type I. Medium Pressure Mercury Vapor (**MPMV**) Lamps.

Type II. Micro Discharge Lamps (**MDL**)

Type III. Light Emitting Diode (**LED**) Lamps

Class A. Portable Dispatch Lamps

Class B. Hand-held Booth Lamps

Class C. Overhead Flood Fixtures

8.1 Lamps used for NDT for aerospace applications shall be tested in accordance with the requirements of Table 1

8.2 Peak irradiance

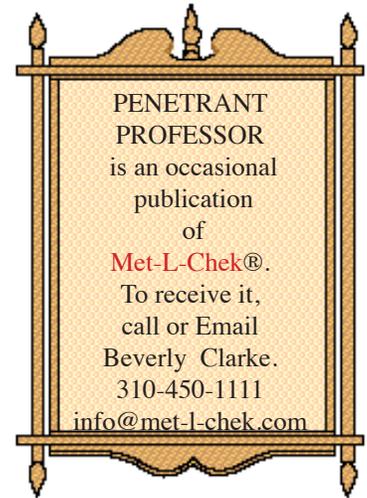
8.3 Useable beam profile

8.4 Working distance

8.5 Emission spectra

8.6 Battery discharge time

8.7 Visible light contamination



The draft contains the detailed test methods to be used, but does not suggest the values that are to be obtained to qualify the sources. While it lists the key requirements by name, no numerical values are included for the various requirements of paragraphs **8.2** through **8.7**, and these must be decided upon before the specification can be finalized.

This draft will be discussed at the **ASTM** meeting in Florida later this month. We can expect **ASTM committee E-07** to devote a significant amount of time to this important subject.

The Penetrant
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Table 1. **UV-A** Lamp Test Requirements

Type	Class	Test Requirements
I	A, B	8.2, 8.3, 8.4
I	C	8.2, 8.3, 8.5
II	A, B	8.2, 8.3, 8.4, 8.5, 8.6, 8.7
II	C	8.2, 8.3, 8.4, 8.5, 8.7
III	A, B	8.2, 8.3, 8.4, 8.5, 8.6, 8.7
III	C	8.2, 8.3, 8.4, 8.5, 8.7