

**DEPARTMENT OF CIVIL AVIATION
MALAYSIA
AIRWORTHINESS NOTICE**

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USE OF HIGH INTENSITY ULTRA-VIOLET LAMPS IN FLOURESCENT PENETRANT AND MAGNETIC PARTICLE INSPECTIONS

1. INTRODUCTION

- 1.1 DCA has been advised that the condition of some high intensity 125 watt ultra-violet self filtered lamps used for fluorescent penetrant and magnetic particle inspections may be unreliable due to the emission of excessive amounts of white light which could compromise reliability of the process to find small defects.
- 1.2 As soon as practicable following the receipt of this Notice all high intensity 125 watt ultra-violet self filtered lamps are required to be tested for excessive white light emission before use and any lamp failing this test is to be rejected.
- 1.3 These ultra-violet lamps must also be periodically tested for excessive white light emission and any lamp failing this test shall be rejected.
- 1.4 A mercury vapour lamp incorporating a woods glass filter which will obviate this problem is available through normal suppliers of ultra-violet lamps.

2. A SUITABLE TEST METHOD TO DETERMINE THE ACCEPTABILITY OF HIGH INTENSITY 125 WATT ULTRA-VIOLET LAMPS FOR FLUORESCENT PENETRANT AND MAGNETIC PARTICLE INSPECTION WITH RESPECT TO WHITE LIGHT EMISSION

- 2.1 The test involves quantitative analysis using a white light meter calibrated to a National Standard.
- 2.2 It is mandatory to perform this test prior to using any such lamp for inspection purposes. This test must also be applied to lamps periodically throughout their service life.
- 2.3 Lamps which show evidence of having been painted shall not be used for inspection purposes.
- 2.4 The test must be performed in a darkened area with ambient background light levels not greater than 2 foot candles.
- 2.5 The test must be performed at a minimum ultra-violet intensity of 1200 uW/cm (1.2 mW/cm)

3. EQUIPMENT

- 3.1 One of the following white light meters calibrated to a National Standard.

- (a) Ardrex DLM 1000
- (b) Minolta T1
- (c) Spectronics DSE 100X. (Ely Chemical Co.)
- (d) Ardrex 8C 1955 – to BS667/4489
- (e) Levy Hill Mk. V to BS667/4489
- (f) Levy Hill Mk. VI to BS667/4489
- (g) Elyscan 2 (Ely Chemical Co.)

- 3.2 Ultra-violet Radiometer calibrated to a National Standard.

4. TEST PROCEDURE

NOTE: It is necessary that the reflector is new or highly polished to ensure that the maximum white light reading is obtained for each lamp.

- 4.1 Using the white light meter in the test position measure the ambient light level and record.
- 4.2 Switch on the lamp to be tested ensuring it is in a suitable reflector and allow sufficient warm-up period (minimum 20 minutes).
- 4.3 Set up the lamp housing in order that the meter head is perpendicular to the lamp, and adjust the distance away from the tip of the self filtered lamp to give an ultra-violet intensity of 1200 uW/cm maximum using the ultra-violet Radiometer. If this is not practical (due to fixed lamps

etc.) then position the ultra-violet Radiometer to obtain the most intense ultra-violet output at a convenient distance and record the value in uW/cm

- 4.4 Position the white light meter to the most intense white light area as indicated, retaining the distance set in paragraph 4.3. Record the value.
- 4.5 Subtract the ambient white light measurement obtained in paragraph 4.1, from the white light measurement obtained from the lamp in paragraph 4.4. Record the value.

5. ACCEPTANCE STANDARD

- 5.1 At an ultra-violet intensity of 1200 uW/cm, the maximum acceptable white light intensity limit varies depending on the meter used. Values for approved meters are given below:

(a)	Ardrox DLM 1000	8 foot candles
(b)	Minolta T1	0.3 foot candles
(c)	Spectronics DSE 100X. (Ely Chemical Co.)	2 foot candles
(d)	Ardrox BC1955	0.9 foot candles
(e)	Levy Hill Mk. V	0.9 foot candles
(f)	Levy Hill Mk. VI	0.9 foot candles
(g)	Elyscan 2 (Ely Chemical Co.)	0.9 foot candles

- 5.2 At any other ultra-violet intensity then the maximum acceptable white light intensity limit must be calculated from the formula:-

White light intensity shall be less than $(Y*Z)/1200$ foot candles
 Where Y = maximum ultra-violet light recorded in uW/cm
 Z = acceptance limit for white light at a measured ultra-violet intensity of 1200 uW/cm for the specific meter used from reference table in paragraph 5.1.

- 5.3 Any lamp having a white light output greater than the limit specified shall not be used for inspection purposes.
- 5.4 Organisations should seek the expertise of a Level 3 person, suitably qualified as reflected in AN No. 52 for accomplishment of the required tests in this notice.

6. IDENTIFICATION

- 6.1 All Lamps tested and accepted shall be identified in accordance with the organisation's procedure.

NOTE: (1) One foot candle = 10.76 lux.

NOTE: (2) White light photometers are calibrated to a National Standard using Tungsten Filament lamps. The spectral output of an ultra-violet lamp is significantly different to that of a Tungsten Filament, and therefore the calibration is not valid. The major source of discrepancy in this case, will be due to emission of shorter wavelength light.

DIRECTOR GENERAL
 DEPARTMENT OF CIVIL AVIATION
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