U.S. ARMY PUBLIC HEALTH CENTER

TIP No. 37-109-0722

Low Mercury Fluorescent Lamps

1. BACKGROUND

In 1994, the National Electrical Manufacturers Association (NEMA) estimated that the United States annually disposes of 500 to 550 million fluorescent lamps. More than 80% of those fluorescent lamps belonged to industrial and commercial facilities. The presence of mercury (Hg) in a fluorescent lamp is essential for the function of the lamp. The fluorescent lamp industry has agreed upon the importance of reducing the amount of Hg found in fluorescent lamps. NEMA has provided statistics that show the average Hg content for a 4-foot, 40-watt T-12 (for 12-eights of an inch or 1.5 inches) lamp has been reduced from 48.2 milligrams to 22.8 milligrams of Hg.

2. NEW TECHNOLOGY

The establishment of the Toxic Characteristic Leaching Procedure (TCLP) standard of 0.2 mg/L for mercury by the Environmental Protection Agency (EPA) made fluorescent lamps a hazardous waste. In 1995, Philips Lighting Company introduced its new “Alto” technology for low mercury fluorescent lamps. The purpose of this technology was to reduce the amount of Hg in the lamps to a level where it would pass the TCLP standard of 0.2 mg/L. Other companies such as General Electric (GE) and Osram Sylvania have followed Philips and developed their own low mercury fluorescent lamps that pass TCLP testing (see paragraph 4). The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) (now known as the U.S. Army Public Health Center) recommends the use of low mercury fluorescent lamps. Currently, to distinguish low mercury fluorescent lamps from normal fluorescent lamps, the three American manufacturers are using some type of green markings for identification. Philips Lighting “Alto” lamps have green end caps. Osram Sylvania “Ecologic” and GE “Ecolux” are using green lettering for identification. Foreign manufacturers may be using green markings on fluorescent lamps; however, the markings may not indicate low mercury.

3. ENERGY-SAVINGS AND LIFE

Currently, the Defense Logistics Agency (DLA) has a tool for finding energy efficient products called the Sustainable Facility Tool or SFtool at https://sftool.gov/green procurement. Energy-Saving fluorescent lamps and low mercury fluorescent lamps can be obtained. When comparing Energy-Saving fluorescent lamps to low mercury fluorescent lamps in wattage and average life, both are comparable with each other with wattage at 32-34 watts and an average life of 15,000-20,000 hours for the 48-inch lamps. However, only the low mercury fluorescent lamps will pass the TCLP test. “Energy-saving” is not synonymous with “low mercury.” If your activity has purchased energy-saving fluorescent lamps believing they were also low mercury, inspect the lamps to ensure they are in fact low mercury lamps.

4. TCLP TEST RESULTS

The TCLP test results obtained from Philips, Sylvania, and GE show these lamps are below the regulatory limit of 0.2 mg/L. The last three tables show test results from sampling performed by USACHPPM of the Philips Alto lamps, GE Ecolux lamps, and Sylvania Ecologic lamps.

5. POINT OF CONTACT

Please contact the Environmental Health Sciences Division, Waste Management Group at 410-436-3651 or DSN 584-3651 for additional information.

6. REFERENCES

- Defense Logistics Agency, *Sustainable Facility Tool*, June 7, 2000, https://sftool.gov/green procurement
- GE Lighting, Certification of Analysis from Alpha Analytical Labs, 17 May 2012, https://safe.menlosecurity.com/doc/docview/viewer/docN909CDD66ECD5fffbfc0c45dd1f72ca66c6424a858d722846118baeb8002a8b256965e3be5252
- Paul Abshire, Fort Detrick Environmental Office, Fax, 4 June 1998, Subject: Information Concerning Philips Alto Lamps.
- Osram Sylvania, Product Safety Data Sheet No. 1.1 Fluorescent Lamps, April 20, 2011, https://safe.menlosecurity.com/doc/docview/viewer/docNCCEE5D73ED16468676d93b1779411a9ca514f83fe52c924074795f11e2741d10ca7cd174acb9
- *Code of Federal Regulations*, "Toxicity Characteristic," Title 40, Part 261.24, Table 1.

Philips "Alto" T8 Medium Bi-Pin

Kelvin Temp	*CRI	Length (inches)	Nominal Watts	Avg. Life	Part Number	NSN	Mfg. TCLP Results [units (mg/L) at chemical (Hg)]
3000	75	48	32	20,000	F32T8/TL730/ALTO	6240-01-447-2666	0.06 (avg of 3 tests)
3500	75			20,000	F32T8/TL735/ALTO	6240-01-447-3464	
4100	75			20,000	F32T8/TL741/ALTO	6240-01-447-3469	
3000	85			20,000	F32T8/TL830/ALTO	6240-01-447-3473	
3500	85			20,000	F32T8/TL835/ALTO	6240-01-447-3480	
4100	85			20,000	F32T8/TL841/ALTO	6240-01-447-3482	
5000	86			20,000	F32T8/TL850/ALTO	6240-01-425-8301	
5000	75			20,000	F32T8TL750/ALTO		

Note: * CRI (Color Rendering Index)

Philips "Alto" T12 Medium Bi-Pin

Kelvin Temp	*CRI	Length (inches)	Nominal Watts	Avg. Life	Part Number	NSN	Mfg. TCLP Results [units (mg/L) at chemical (Hg)]
4100	51	48	34	20,000	F40T12LW/RS/EW/ALTO		0.10 (avg of 8 test)
3000	53	24	20	9,000	F20T12/WW/ALTO		
3000	53	48	34	20,000	F40T12WW/R S/EW/A		
4100	62	24	20	9000	F20T12CW/R S/EW/ALTO	6240-01-453-6482	
4100	62	36	30	18,000	F30T12CW/RS/ALTO		
4100	62	36	25	18,000	F30T12/C W/RS/E W/ALTO		
4100	62	48	34	20,000	F40T12CW/R S/EW/A LTO	6240-01-424-9648	
4100	62	96	60	12,000	F96T12/CW/EW/ALTO	6240-01-453-6482	
6500	84	48	34	20,000	F40T12DX/R S/EW/A LTO		
3000	70		40		F40T12/SPEC30/RS/EW/ALTO	6240-01-431-3093	0.12 (avg of 4 ests)
4100	70				F40T12/SPEC41/RS/EW/ALTO	6240-01-431-3268	
3000	70				F40/SPEC30/ALTO		
4100	70				F40SPEC41/ALTO		
3500	73	48	40	20,000	F40T12/SPEC35/RS/EW/ALTO	6240-01-431-3257	0.12 (avg 0f 4 tests)
3500	73				F40/SPEC35/ALTO		
3000	85				F40T12Ultralume/30U/RS/EW/ALTO	6240-01-431-3314	
3500	85				F40T12Ultralume/35U/RS/EW/ALTO	6240-01-431-3331	
4100	85				F40T12Ultralume/41U/RS/EW/ALTO	6240-01-431-3359	
5000	85				F40T12Ultralume/50U/RS/EW/ALTO	6240-01-431-3363	
3000	85				F40/30U/ALTO		
3500	85				F40/35U/ALTO		
4100	85				F40/41U/ALTO		
5000	85				F40/50U/ALTO		

Philips "Alto" T12 Single Pin

Kelvin Temp	*CRI	Length (inches)	Nominal Watts	Avg. Life	Part Number	NSN	Mfg. TCLP Results [units (mg/L) at chemical (Hg)]
4100	62	9 6	60	12,000	F96T12/CW/EW/ALTO	6240-01-453-7614	0.10 (avg of 8 tests)

Osram Sylvania "ECOLOGIC"

T8 Ecologic Octron series, Medium Bi Pin							
Kelvin Temp	*CRI	Length (inches)	Nominal Watts	Avg. Life	Part Number	NSN	Mfg. TCLP Results [units (mg/L) at chemical (Hg)]
3000	75	48	32	20,000	F032/730/ECO	6240-01-457-3789	0.09
3500	75				F32/735/ECO	6240-01-457-3792	
4100	75				F32/741/ECO	6240-01-457-3794	
3000	82				F32/830/ECO	6240-01-457-3798	0.11
3500	82				F32/835/ECO	6240-01-457-3806	
4100	82				F32/841/ECO	6240-01-457-3811	
T8 Ecologic Octron Curvalume (1-5/8 inch leg spacing), Medium Bi Pin							
3000	82	22.5	32	20,000	FBO31/830/ECO	6240-01-457-3814	
3500	82				FBO31/835/ECO	6240-01-457-3817	
4100	82				FBO31/841/ECO	6240-01-457-3825	

GE "ECOLUX"

T8 ECOLUX, Medium Bi Pin							
3000	78	48	32	20,000	F32T8/SP30/ECO	6240-01-454-0810	
3500	78				F32T8/SP35/ECO	6240-01-454-0817	
4100	78				F32T8/SP41/ECO	6240-01-454-0820	0.06
3000	86				F32T8/SPX30/ECO	6240-01-454-0824	
3500	86				F32T8/SPX35/ECO	6240-01-454-0827	
4100	86				F32T8/SPX41/ECO	6240-01-454-0831	
F40 Watt-Miser Ecolux, Medium Bi Pin							
3000	70	-	-	20,000	F40SP30/RS/WM/ECO	6240-01-454-0846	
3500	73				F40SP35/RS/WM/ECO	6240-01-454-0853	
4100	72				F40SP41/RS/WM/ECO	6240-01-454-0855	
3000	82				F40SPX30/RS/WM/ECO	6240-01-454-0858	
3500	82				F40SPX35/RS/WM/ECO	6240-01-454-0860	
4100	80				F40SPX41/RS/WM/ECO	6240-01-454-0864	
T12 F36 Watt-Miser Ecolux, Medium Bi Pin							
4150	62	96	32	12,000	F96T12/CW/WM/ECO	6240-01-454-0872	
3000	70				F96T12/SP30/WM/ECO	6240-01-454-0873	
3500	73				F96T12/SP35/WM/ECO	6240-01-454-0889	
4100	72				F96T12/SP41/WM/ECO	6240-01-454-0890	
3000	82				F96T12/SPX30/WM/ECO	6240-01-454-0896	
3500	82				F96T12/SPX35/WM/ECO	6240-01-454-0895	
4100	80				F96T12/SPX41/WM/ECO	6240-01-454-0899	

Note: * CRI (Color Rendering Index)

USACHPPM TCLP Testing of 10 Philips Alto F3278/TL741 Fluorescent Lamps for Verification of Manufacturer TCLP Testing

Sample	Result/Units of Mercury (mg/L)	Method Detection Limit	Regulatory Limit for Mercury
Bulb-1	0.03	0.0100 mg/L	0.2000 mg/L
Bulb-2	0.05		
Bulb-3	0.16		
Bulb-4	0.12		
Bulb-5	0.12		
Bulb-6	0.11		
Bulb-7	0.19		
Bulb-8	0.15		
Bulb-9	<0.01		
Bulb-10	0.02		

Note: Analytical Method: EPA 7470A /Date Analyzed: 7 May 2001

USACHPPM TCLP Testing of GE Ecolux Fluorescent Lamps for Verification of Manufacturer TCLP Testing

Sample	Result/Units of Mercury (mg/L)	Method Detection Limit	Regulatory Limit for Mercury
5799001 1GE	<0.010	0.0100 mg/L	0.2000 mg/L
5799002 2GE	<0.010		
5799003 3GE	<0.010		
5799004 4GE	0.021		
5799005 5GE	<0.010		
5799006 6GE	<0.010		
5799007 7GE	<0.010		
5799008 8GE	<0.010		
5799009 9GE	0.012		
5799010 10GE	0.017		

Note: Analytical Method Used: EPA 7470A /Date of Analysis: 16 July 2002

USACHPPM TCLP Testing of Sylvania Ecologic Fluorescent Lamps for Verification of Manufacturer TCLP Testing

Sample	Result/Units of Mercury (mg/L)	Method Detection Limit	Regulatory Limit for Mercury
5799011 1 Sylvania	0.027	0.0100 mg/L	0.2000 mg/L
5799012 2 Sylvania	0.081		
5799013 3 Sylvania	0.073		
5799014 4 Sylvania	0.024		
5799015 5 Sylvania	0.11		
5799016 6 Sylvania	0.092		
5799017 7 Sylvania	0.056		
5799018 8 Sylvania	0.025		
5799019 9 Sylvania	0.084		
5799020 10 Sylvania	0.028		
5799020 11 Sylvania	0.15		
5799020 12 Sylvania	0.096		
5799020 13 Sylvania	<0.010		
5799020 14 Sylvania	<0.010		
5799020 15 Sylvania	0.041		

Note: Analytical Method Used: EPA 7470A /Date of Analysis: 15 July 2002