

Lighting Retrofits

The low hanging fruit
or is it?

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Low hanging fruit because:

- Savings are real and predictable
- Retrofits are as good or better than the original
- Fast paybacks

Assumptions for cost benefit analysis

- \$5.50 per kW demand charge and 4¢/kWh energy charge.
- 136 hours per week of operation
- \$50 to \$75 per fixture labor charge to retrofit

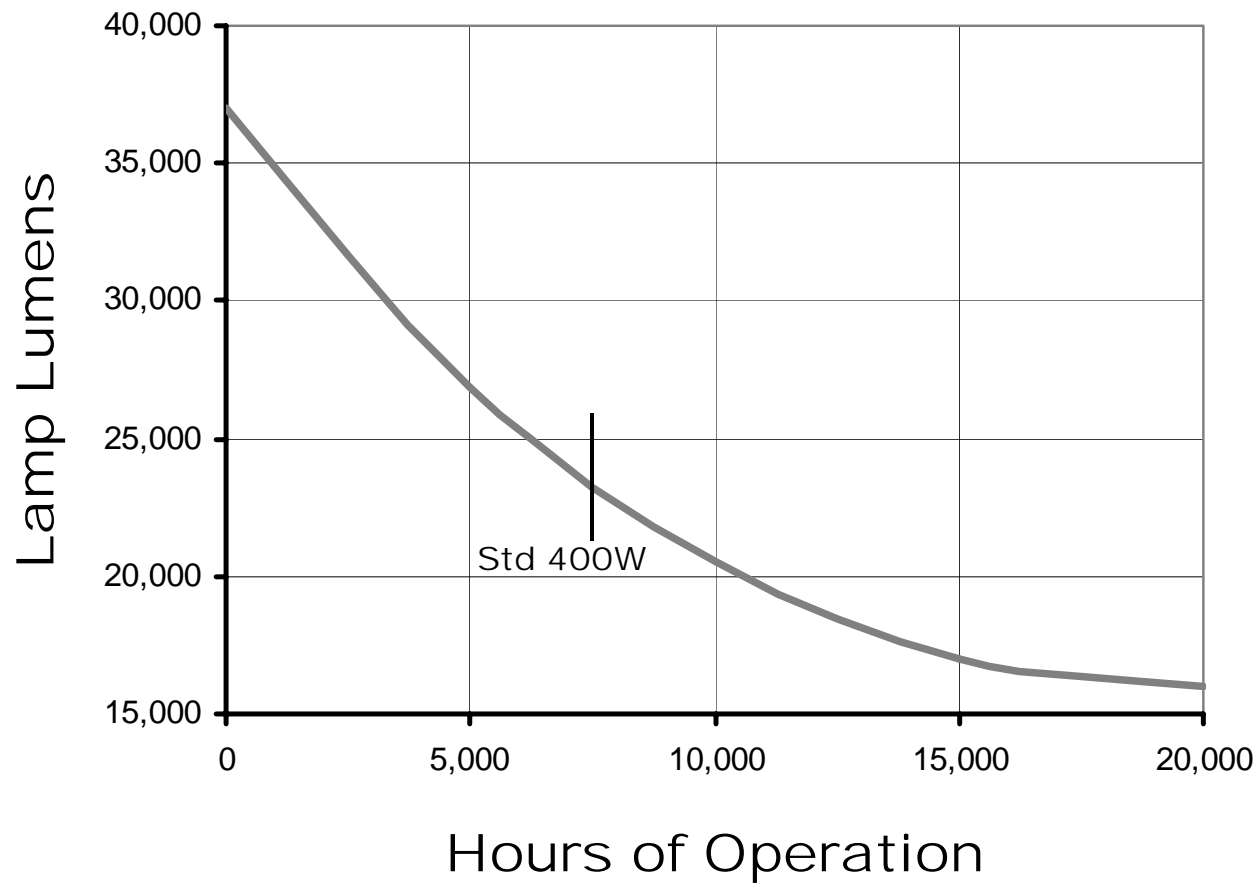
Reference fixture 400 W metal halide



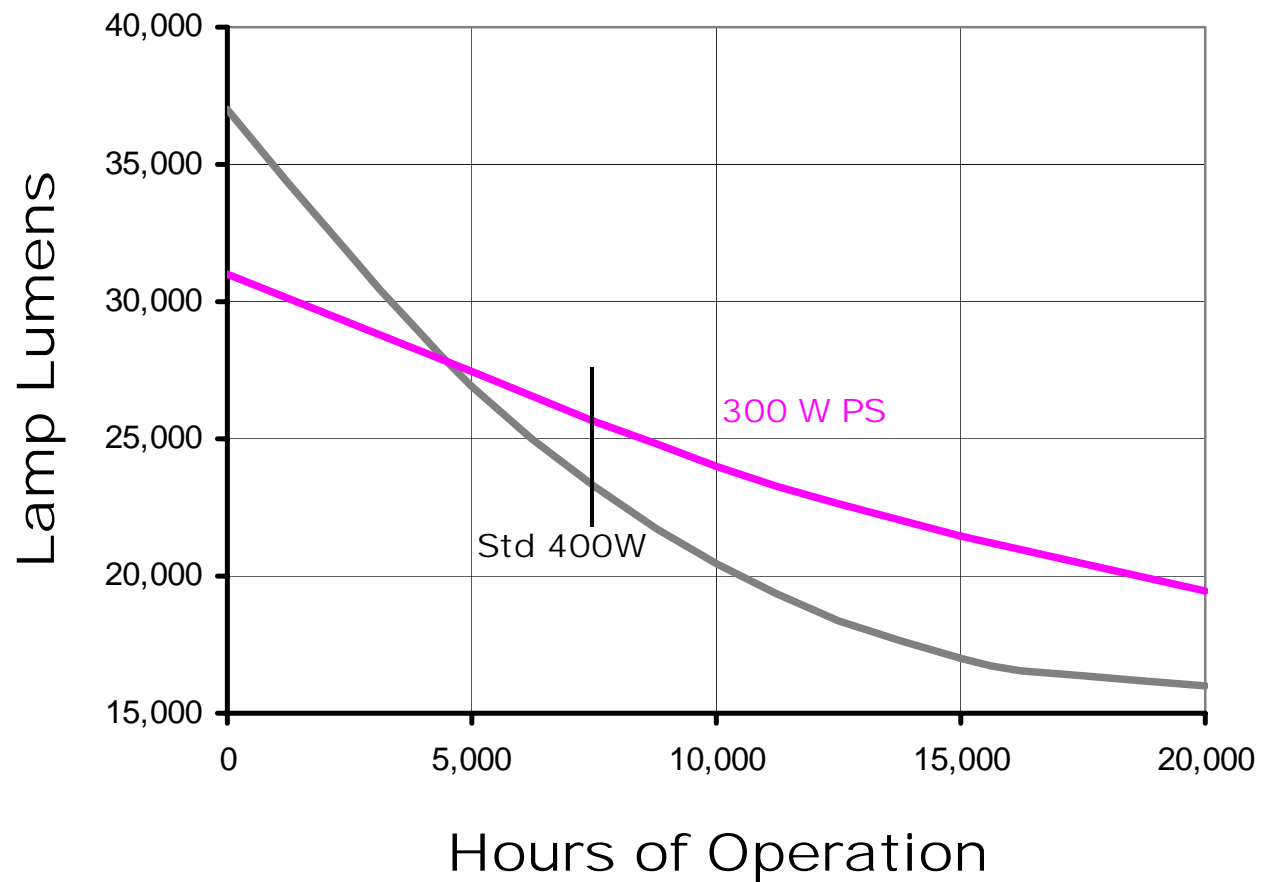
The problem with standard 400 W Metal Halide lamps

- They are no more efficient than a high output fluorescent lamp
- When the voltage sags they go out and may require up to 20 min. to restrike
- Color rendition (CRI) is OK – on the order of 65, incandescent is 100
- They lose light output relatively fast
(Costs \$162.65 per year to run)

Lumen Depreciation



Lumen Depreciation



Simplest option

Pulse start Metal Halide, 300 W or 340 W

+ Equivalent to 400 W and easy to retrofit

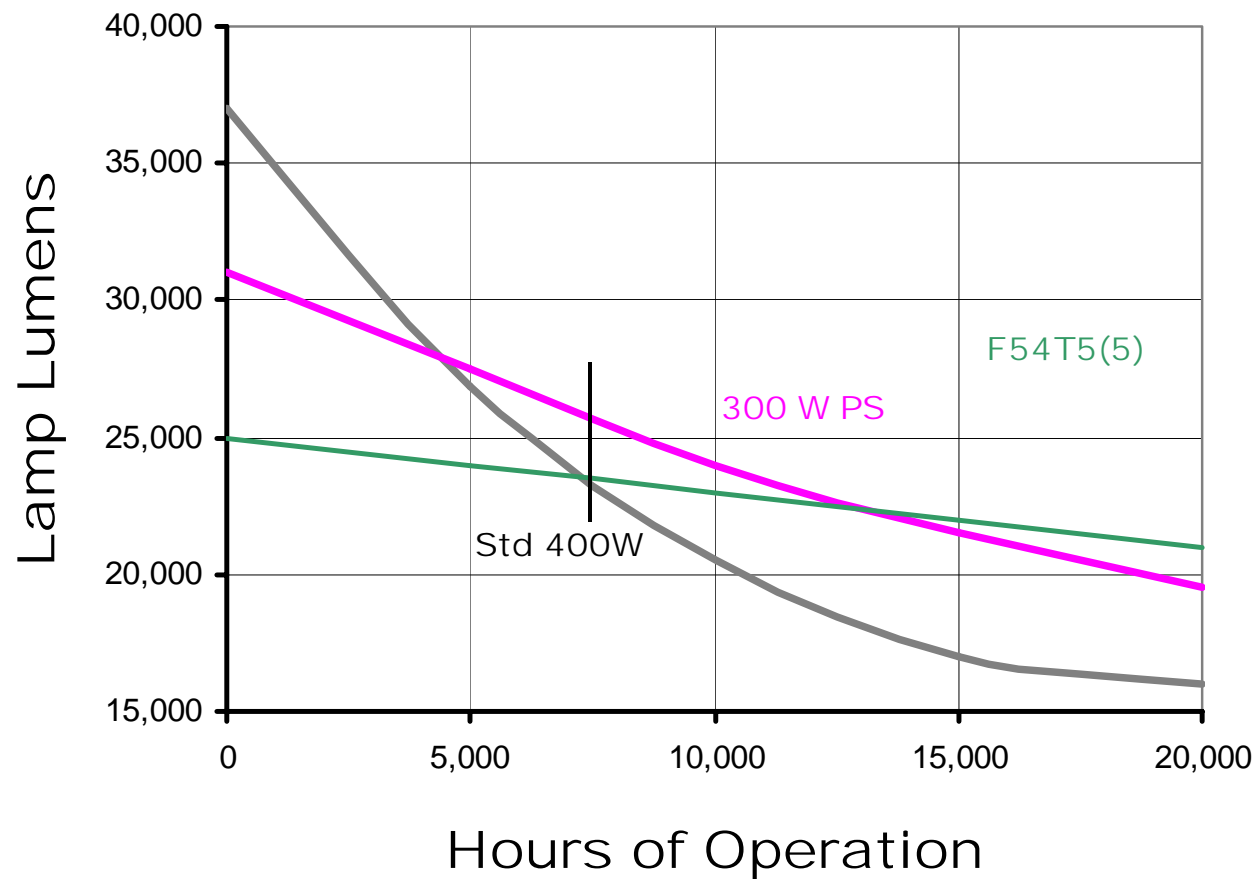
+ One lamp per fixture to maintain

+ Quicker restrike

- Higher wattage than other options

(\$42 annual savings, \$50 to retrofit, \$95 to purchase – 42 month payback)

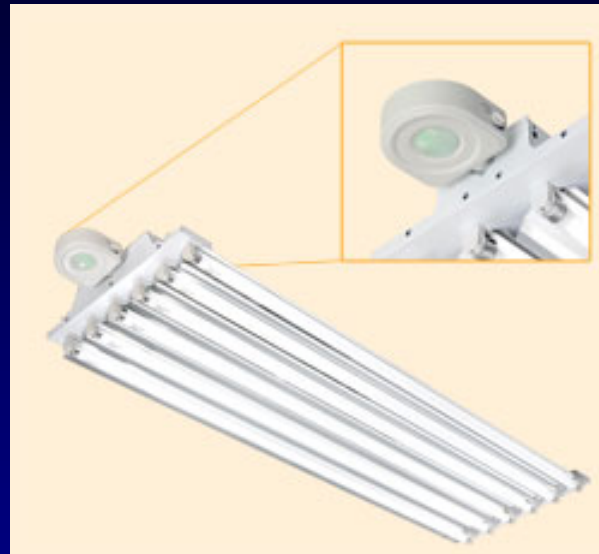
Lumen Depreciation II



Retrofit fixtures with fluorescent lamps in them

- Advantages
 - Very low wattage
 - Excellent CRI
 - Easy to install
 - Don't suffer from restrike delay
 - Can easily be used with controls
 - May be able to lower illumination level
- Disadvantages
 - 4 to 8 lamps per fixture
 - May not produce the illumination advertised

Many Fluorescent Options



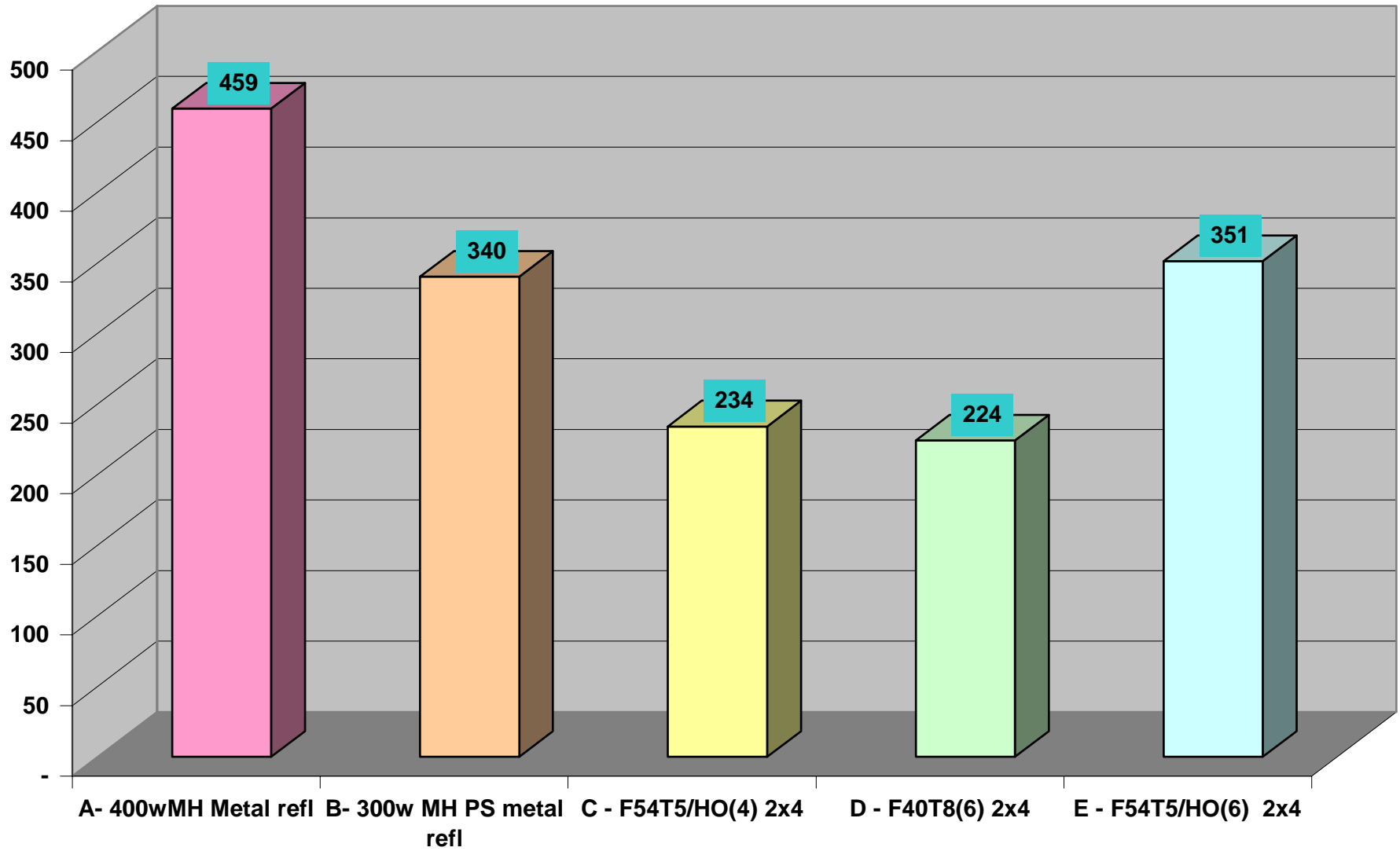
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Lighting types compared

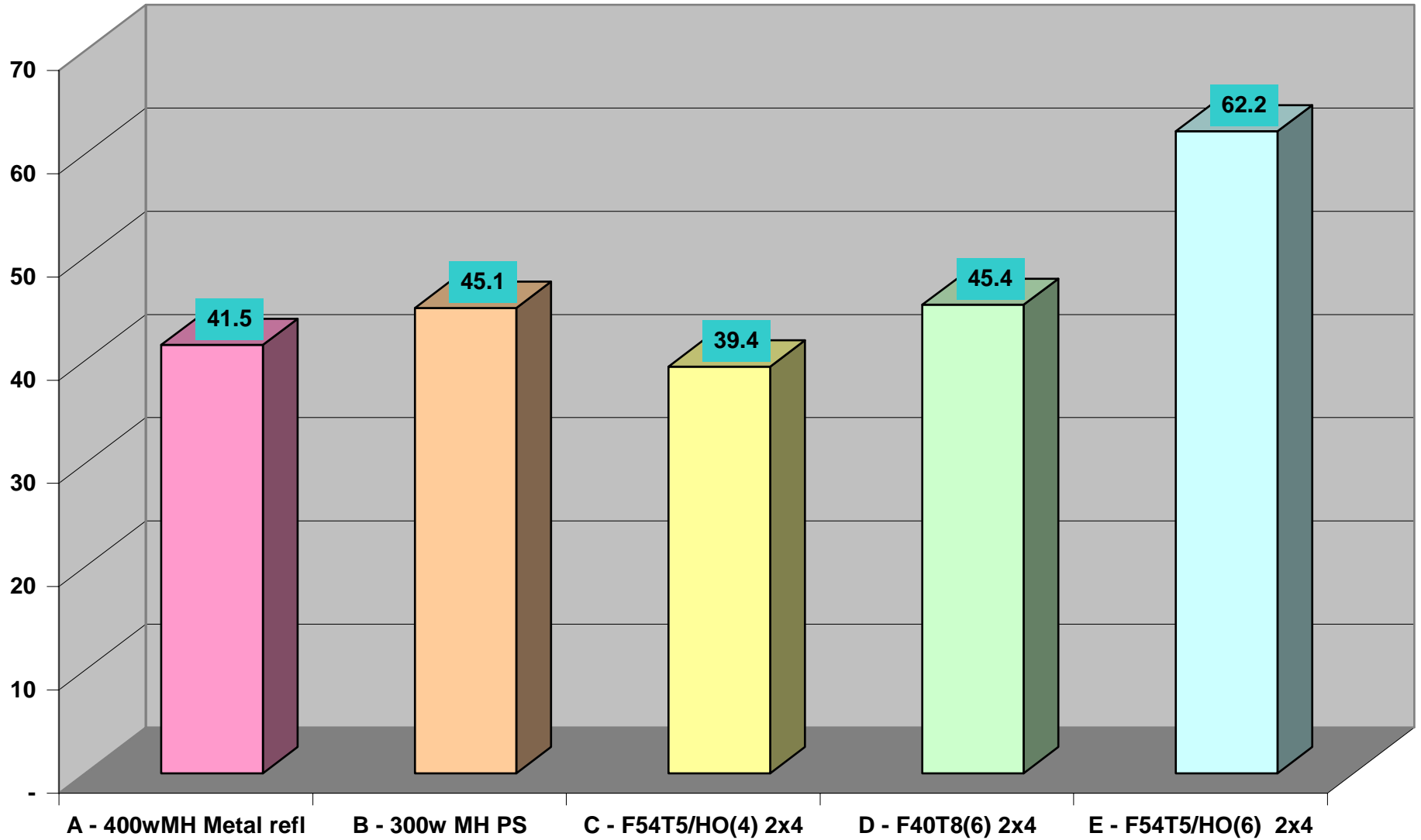
All options have 50 fixtures

- Current A – 400 W MH
- Option B – 300 W MH PS
- Option C – F54T5/HO – 4-lamps
- Option D – F32T8, HO ballast – 4-lamps
- Option E – F54T5/HO – 6-lamps

Input Watts/Fixture



Illumination (fc)



Payback

Payback (Years)	B - 300w MH PS	C - F54T5/HO(4)	D - F40T8(6)	E - F54T5/HO(6)
w/ maintenance	3.55	3.34	2.52	9.09
w/o maintenance	3.49	3.25	2.68	7.34

Replacement lamps	18	47	88	70
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Some Manufactures May be Using Snake Oil to Push Their Product

- Not comparing similar fixtures
- Using color to promote better seeability with lower illumination

Fixtures with glass reflectors



Light level reduced
from 41.5 fc to 31.8

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Is this real? Scoptic sight



**4000k MVR Metal Halide
85 Design Lumens/Watt
107 Pupil Lumens/Watt**



**UltraLux™ High Bay
w/BlueMax™
88 Design Lumens/Watt
202 Pupil Lumens/Watt**

Questions

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