

## DSC Policy on Museum Lighting Power Density Design Values

*Lighting Power density for museum general exhibition areas shall be less than or equal to 1.0 W/sf (with a goal of no more than 0.7 W/sf). An additional 1.0 W/sf (with a goal of no more than 0.7 W/sf) is permitted for highlighting exhibits. The designed power density for the general museum lighting and exhibit lighting shall be included in building energy calculations when demonstrating energy efficiency beyond an ASHRAE 90.1 compliant version of the same building by at least 30%. The model for the ASHRAE 90.1 compliant version of the building shall assume that lighting power density is no greater than 1.0 W/sf for general exhibition areas and no greater than 2.0 W/sf in areas highlighting exhibits.*

### Background

The Denver Service Center (DSC) has adopted the position that it will pursue sustainability in all of its projects. This includes the efficient use of energy.

Lighting has a substantial impact on the energy use of buildings. Not only is energy used to create the light, but the heat that lighting creates must be removed from areas, particularly during the cooling season. Recently, projects have been proposed with lighting power densities as high as 10 W/sf. This level of lighting or more importantly this level of power use has a dramatic impact on the sustainability of a project. 10 W/sf is the same as approximately 350 sf/ton of cooling. 350 sf/ton is a typical maximum summertime cooling requirement for a commercial building. Therefore a lighting power density of 10W/sf approximately doubles the peak cooling requirement of a typical space. In contrast lighting power densities of 1-2 W/sf add about 10-20% to this typical peak cooling requirement.

ASHRAE 90.1-2007 limits the lighting power density for museum general exhibition areas to 1W/sf. It also provides an allowance of an additional 1W/sf for highlighting art or exhibits. While it is also true that ASHRAE 90.1-2007 provides an exception to these limits for “display or accent lighting that is an essential element for the function performed in galleries, museums, and monuments”, it is the position of the DSC that this exception should not apply to buildings or exhibits for which it is responsible.

Existing federal regulations require new and major renovations to federal buildings demonstrate that the resulting construction uses at least 30% less energy than a comparable ASHRAE 90.1-2007 compliant building. If every energy consuming element of the building were designed to use less energy by this 30%, then the lighting power density for museum general exhibition areas should be limited to 0.7W/sf with an additional allowance of 0.7 W/sf for highlighting exhibits.