

## Site

Biosphere 2

## Location

Oracle, Arizona

## Window Film

Luminance V28

## Product Series

Dual-Reflective Series



## SITUATION

Biosphere 2 is an eight-story steel and glass world set in the high desert country of southern Arizona that cost \$200 million to build. Construction of Biosphere 2 (so named because its creators viewed Earth as Biosphere 1) began in 1984, financed by Texas businessman Edward P. Bass. The aim was to have human inhabitants thrive in a miniature world made of a sea, savanna, mangrove swamp, rain forest, desert and farm; the areas and atmospheres interacting to form a totally independent life support system. It is one of the leading attractions in Arizona with hundreds of thousands of visitors a year. Under the auspices of Columbia University (and University of Arizona as of 2011), it is an earth learning center dedicated to research, education and public programs. The habitation area in which eight men and women, the original Biospherians, were encapsulated for two years has been sealed off and transformed into a highly informative visitor center, full of exhibits on climactic change. The sun's rays pouring through the huge multi-paned geodesic domed visitor center, which is the public hub of Biosphere 2 caused a real problem. Heat and glare made it uncomfortable for thousands of visitors resulting in less than full enjoyment of the exhibits.

## SOLUTION

Solar control window film was the clear solution to the problem. Mr. Philip Lemanski, Chief Financial Officer for Biosphere 2, chose Vista™ by LLumar® Luminance to do the job. Vista Luminance substantially reduced glare in the building and rejected the total solar energy usually transmitted through the glass by 64 percent. Vista Window Film was also installed in the Center's computer room which significantly increased efficiency by taking sun glare off the screens and facilitated data reading.

## RESULT

"The absence of glare and the cool temperate climate in the exhibit center has immeasurably added to the enjoyment of our visitors and encouraged them to spend more time viewing the exhibits," Mr. Lemanski remarked, "We are very pleased with our choice of Vista Window Film."



BEFORE



AFTER

## Performance Data

|                        | % Total Solar Transmittance | % Total Solar Reflectance | % Total Solar Absorbance | % Visible Light Transmittance | % Visible Reflectance (exterior) | % Visible Reflectance (interior) | Winter U-value | Shading Coefficient | % Ultraviolet Ray Protection (wavelengths 280-380nm) | Emissivity | Solar Heat Gain Coefficient | % Total Solar Energy Rejected | Light-to-Solar Heat Gain Ratio (LSG) | % Summer Solar Heat Gain Reduction | % Winter Heat Loss Reduction | % Glare Reduction |
|------------------------|-----------------------------|---------------------------|--------------------------|-------------------------------|----------------------------------|----------------------------------|----------------|---------------------|--|------------|-----------------------------|-------------------------------|--------------------------------------|------------------------------------|------------------------------|-------------------|
| Clear Glass            | 83                          | 8                         | 9                        | 90                            | 8                                | 8                                | 1.03           | 1.00                | 29   | 0.84       | 0.86                        | 14                            | 1.05                                 | -                                  | -                            | -                 |
| Dual-Reflective Series |                             |                           |                          |                               |                                  |                                  |                |                     |  |            |                             |                               |                                      |                                    |                              |                   |
| Luminance V28 SR CDF   | 23                          | 33                        | 44                       | 30                            | 33                               | 21                               | 1.01           | 0.41                | >99  | 0.77       | 0.36                        | 64                            | 0.83                                 | 58                                 | 3                            | 67                |

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The solar performance data reported for LLumar architectural window films was captured using the National Fenestration Rating Council's (NFRC) standard guidelines for window film solar performance measurement as measured on single pane, 1/8 inch (3 mm), clear glass. Reported values are taken from representative product samples and are subject to normal manufacturing variances. Actual performance will vary based on a number of factors, including glass type and properties. \*Films do not eliminate fading—they reduce it. UV rays and heat are contributing factors to fading but other factors exist. For further information see [LLumar.com/download-library](http://LLumar.com/download-library). © 2008, revised 2016 Eastman Chemical Company. VISTA™, the VISTA® logo, LLumar®, the LLumar® logo and Enerlogic® are trademarks of Eastman Chemical Company or one of its wholly owned subsidiaries. As used herein, ® denotes registered trademark status in the U.S. only. (06/16) SP1077