

AAG&LEED

AAG, since its founding in 2002, has been committed to environmental stewardship and demonstrated this commitment in both its responsible manufacturing processes and its energy-efficient selection of glass products.

As one of the largest glass suppliers to the local industry, AAG adheres strictly to:

- the specific standards set forth by the Dubai Municipality under the issuance of Resolution no. 66, approving regulations of technical specifications for Thermal Insulation and rationalization of Power Consumption for air-conditioned buildings in the Emirate of Dubai.
- architectural guidelines imposed by the 'District Specific Guidelines' within DIFC and immediate surroundings.
- compulsory guidelines for other specific areas within the UAE or other local municipalities.

AAG therefore supports the intent of implementing the specific standards set forth in the LEED (Leadership in Environmental and Energy Design) Green Building Rating System and as a corporate member, supports the concern of the EGBC to propose LEED (pilot program currently lodged for evaluation) as an assessment system to quantify a degree of sustainability for new buildings.

The American version of LEED covers actually 4 levels of Certification:

CERTIFIED: 26-32 POINTS
SILVER: 33-38 POINTS
GOLD: 39-51 POINTS
PLATINUM: 52-69 POINTS

These 69 achievable points are distributed of 6 categories covering the entire building process, including everything from site selection all the way through building occupancy and comfort of the tenant.

EGBC is proposing a modification to the American system by increasing the pointing system to 72, the additions mainly related to putting more emphasis on water conservation and making the content more applicable to use in the UAE.



While LEED does not certify individual building products, it does recognize that the selection of such products can play a vital role in making a building LEED compliant. Depending on how they are specified and installed, architectural glass-products from AAG can have a significant effect on the total environmental impact of a commercial / residential construction.

AAG refers to Ecospecifier*, which is a world renowned ecological and health preferred database of verified information on the life cycle impacts of built environmental products, materials and technologies.

Ecospecifier assesses products in the context of International Green Building Rating Schemes and delivers full awareness of the eco-preferred properties of our products.

Our complete product line includes insulating, laminated, silk-screened, heat treated, acoustical, curved and high-performance selective coated glass. A combination of the above may help secure points towards LEED Certification for a project in the following categories:

- Energy and Atmosphere (EA)
- Material & Resources (MR)
- Indoor Environmental Quality (EQ)

This document is designed to help architects, designers, specifiers, building owners and others interested in earning LEED Certification for their buildings through the use of selective, high performance glass and should not be used as a substitute for the actual LEED documentation, which can be downloaded at <http://www.usgbc.org>.

The following describes those LEED categories where AAG glass-products may support the high standards defined by LEED.

*Check link: http://www.ecospecifier.ae/suppliers/al_abbar_architectural_glass_aag

LEED-NC CATEGORY: ENERGY & ATMOSPHERE (EA)

Intent: achieve increasing levels of energy performance above the pre-requisite standard to reduce environmental impacts associated with excessive energy use.

There are 3 pre-requisites* in the E&A category and 6 available credits. Appropriate glass selection can help with one of the 3 pre-requisites and one of the 6 credit areas.

EA Pre-requisite 2 : Minimum Energy Performance

Comply with both the mandatory provisions and the prescriptive or performance requirements of ASHRAE/IESNA standard 90.1-2004

EA Credit 1: Optimize Energy Performance (1 to 10 points) there are 3 selective methods of compliance:

(1) Whole building simulation: Demonstrate a percentage improvement in the proposed building performance rating, compared to the baseline building performance rating as per ASHRAE/IESNA Standard 90.1-2004 (without amendments) by a whole building simulation. The further the Standard is exceeded, the more points are achieved. (example exceeding 14% = 2 points, exceeding 28% = 6 points, exceeding 42% = max 10 points)

(2) Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Small Office Buildings 2004. The method is only available for buildings below 2,000m². (4 points)

(3) Prescriptive Compliance (1 point): As of June 27, 2007 all LEED projects must achieve at least 2 points for EA Credit 1. If a project was not registered prior to this date, the 2 points are mandatory.

** Note: A pre-requisite is worth no points; however they must be met or done in order to achieve any LEED certification. In the LEED rating system a credit is not the same as a point. A credit is essentially an area of emphasis within the category; Each credit has a number of points available within it.*

AAG CONTRIBUTION

AAG offers a number of energy-efficient, low-emissivity glass-types that can help architects, contractors and building owners to specify products that can help to meet LEED criteria for energy performance optimization in order to deliver maximum year-round energy performance.

This range includes:

CoolRay and e-Cool glass-types: Off-line magnetron sputtered low-E coated products designed to maximize energy efficiency, as well as highest visible light transmittance and colour neutrality and rendering index. CoolRay and e-Cool glass (surface #2 or #3) on clear or tinted substrates meet a wide range of performance by delivering lower annual energy costs.

All CoolRay glass-types, whether on clear or tinted glass, and e-Cool glass-types (with the exception of bronze & grey), are spectrally selective as defined by the U.S. Department of Energy, achieving a light-to-solar gain ratio (LSG) of 1.25 or higher (up to 1.90 in the CoolRay range).

CoolPane glass-types: To achieve the lowest possible solar factors ranging from 7% to 30% in solar factors (SHGC). Note that CoolPane glass-types are mostly below LSG: 1 and cannot be considered spectrally selective.



LEED-NC CATEGORY: MATERIALS & RESOURCES (MR)

Intent: increase demand for building products that incorporate recycled content materials, therefore reducing impacts resulting from extraction and processing of new virgin materials, thereby supporting the regional economy and reducing environmental impact from transportation.

There is one pre-requisite along with 7 credits available in M&R. Glass selection can help with 2 credits.

MR Credit 4.1 & 4.2 : specify materials with recycled content (1 point per credit)

Requirements for Credit 4.1: Use materials with recycled content such that the post-consumer recycled content constitutes at least 10% of the total value of the materials in the project (post-consumer – UAE LEED pilot!)

Requirements for Credit 4.2: Use materials with recycled content such that the post-consumer recycled content constitutes an additional 10% beyond MR Credit 4.1 (total 20%) of the total value of the materials in the project. (post-consumer – UAE LEED pilot!)

AAG CONTRIBUTION

LEED guidelines specifically define pre-consumer recycled content to exclude scrap materials generated during the processing and re-claimed within the same process. Recycled content of a material assembly shall be defined in accordance with ISO14021 and its value is determined by weight.

Float glass used in commercial applications contains \pm 20% industrial and 0% post-consumer recycled content. AAG returns between 10 to 20% of waste of its clear glass consumption to the local float manufacturer (Guardian RAK) for reprocessing.

AAG is in a position to assist the Architect / Contractor to compile and evaluate the glass contribution and gather required recycled content information to determine credit compliance.

MR Credit 5.1 & 5.2: Specify materials that have been extracted, harvested or recovered, as well as manufactured within 500 miles of the project site (1 point per credit) .

Requirements for Credit 5.1: Use a minimum of 10% of building materials or products that have been extracted, processed & manufactured regionally within a radius of 500 miles of the project site.

Requirements for Credit 5.2: Use an additional 10% beyond MR Credit 5.1 (total 20%) of building materials or products that have been extracted , processed & manufactured regionally within a radius of 500 miles of the project site.

AAG CONTRIBUTION

AAG uses several different materials in the process of fabrication (glass, spacer-tubes, primary & secondary sealants , desiccant , polymer and PVB interlayers , ceramic frit , opaci-coating materials etc..) coming from a variety of suppliers. Each supplier uses raw materials extracted from multiple locations.

Clear glass substrates for incorporation into IGU (outer or inner pane) are sourced from UAE float manufacturing companies, within the 500 miles radius , who themselves source and harvest their raw materials within the same radius. Depending on the selection of the glass-type therefore up to 90% of the material value (glass units) can be sourced locally.

If tinted substrates are required for the outer pane, AAG will source from overseas float manufacturing companies that comply with the raw material sourcing and harvesting within the 500 miles radius. Nonetheless, the glass will have to be bought directly or from local distributors.

LEED-NC CATEGORY: INDOOR ENVIRONMENTAL QUALITY (EQ)

Intent: Provide for the building occupants a connection between in-door spaces and the outdoor through the introduction of daylight and views into the regularly occupied areas of the building. There are 2 pre-requisites along with 8 credits available in Indoor Environment category. Glass selection can help with one credit in this area.

EQ Credit 8.1& 8.2 : Daylight & Views (1 point per credit)

Requirements for Credit 8.1: achieve 75% of regularly occupied spaces. There are 3 methods to demonstrate compliance:

(1) calculation: achieve a minimum of 2% glazing factor in a minimum of 75% of a regularly occupied areas by calculation method as follows:

$$\frac{\text{window area (m2)}}{\text{floor area}} \times \frac{\text{window}}{\text{geom. factor}} \times \frac{\text{actual LT}}{\text{minimum LT}} \times \frac{\text{window}}{\text{height factor}}$$

(2) computer simulation: demonstrating a minimum daylight illumination of 25 foot-candles in a minimum of 75% of all regularly occupied areas.

(3) measurement: through records of indoor light measurements indicating that 75% of all regularly occupied areas have a minimum of 25 foot-candles.

Spaces excluded from this requirement exclude copy-rooms, storage areas, mechanical plant rooms, laundry rooms and other low occupancy support areas. Other exceptions for spaces where tasks would be hindered by the use of daylight will be considered on their merits. Windows above 2286mm and below 762mm are not to be used in daylight calculations.

Requirements for Credit 8.2: achieve direct line of sight to vision glazing for building occupants in 90% of all regularly occupied spaces, between 2286mm from the floor and not less 762mm. Exceptions as for MR Credit 8.1

AAG CONTRIBUTION

The USGBC provides a few strategies to maximize day-lighting, but the recommendations are in direct relation to the building location, orientation, shading devices etc... AAG can only suggest glass types that will fit the requirement to achieve the day-lighting credits. The CoolRay and e-Cool range provides optimum daylight penetration and views to help meet these requirements. Light transmittances up to 75% with clear substrates and 61% with tinted substrates can be achieved, in combination of controlled energy performance.

For vertical glazing, used to provide daylight such as transoms above the typical vision glass, but below 2286mm, the minimum is LT 70%. (example e-Cool on clear or CoolRay Elite on low-iron clear)

For vertical glazing in typical vision areas, and skylights, the minimum is 40% (most e-Cool coated types and several CoolRay types – see brochure).





STRATEGIES AND HINTS

SUCCESSFUL STRATEGIES TO CONSIDER AS TO IMPROVE CREDIT POTENTIAL

- Consider vision glazing only when applying lines of sight to interior spaces. Daylight glazing (above 2286mm) offers the most benefit for harvesting daylight deeper into the space .
- Consider footprint shape and space layout early in design to maximize views to glazing.
- Achieving daylight credits will likely increase energy savings in the Energy and Atmosphere Credits. This is largely due to saving in the electric lighting influenced from well day-lit spaces.
- Day lighting strategies can have synergies with other energy efficiency strategies such as de-placement of ventilation.
- Education of subcontractors on recycling practices and established penalties (such as fees) for not following these practices help achieve the highest percentage of construction waste diverted from the landfill.
- Incentives, given by the general contractor or owner, to subcontractors for meeting targeted MR goals can both motivate and benefit all involved.

USEFUL HINTS TO IMPLEMENT

- Design the building floor plate so that as many regularly occupied spaces as possible are located near the perimeter, with access to glazing. Open offices should be located at the perimeter with enclosed spaces and support areas near the building core.
- Use of effective solar control strategies (overhangs, recesses) and spectrally, selective high performance glass-types will limit excessive solar gains
- Consider glass-types with highest color rendering index .
- Maximize viewing (floor to ceiling) area thus allowing more daylight, include 'modesty' area (spandrel position) with properly designed silkscreen pattern or other .
- Perform preliminary space area calculations early in design to determine if design approach will easily achieve the appropriate level of views for the building occupants.
- The USGBC calculation methods (requiring a two percent daylight factor) can require prohibitively high interior luminance levels in climates with high exterior luminance levels.
- Consider non-tangible benefits of increased day lighting design, including increased productivity, decreased absenteeism and errors, reduced salaries for appealing work environments, etc.
- Separate guidelines are being developed specifically to address perceived shortcomings in the current energy performance evaluation system. In general, it is best to work with an energy modeler who is versed in LEED Energy Cost Budget requirements to best estimate the percentage of energy cost savings that will be approved by the USGBC for a given project or building type.

