



Wausau Window and Wall Systems' LEED® -Silver Manufacturing Center

Wausau, Wisconsin Somerville Associates Architects

Wausau Window and Wall systems' primary manufacturing center, opened in September 2008, has been certified Silver through the USGBC LEED® Green Building Rating System™.

While justifiably proud, we understand that LEED® is just a tool - a means to an end. The sustainable design movement is really about the triple bottom line - *protecting the environment, social responsibility, and financial viability.*

LEED® - Silver Facility



Aerial View

Sustainable Construction Practices and Operation

- ▶ Construction waste recycling
- ▶ Facility manager electrical load shedding
- ▶ Advanced commissioning
- ▶ Significant utility cost savings documented annually

Sustainable Manufacturing Processes

- ▶ Minimized packaging materials in receiving and shipping
- ▶ Scrap recycling: aluminum, steel, cardboard, wood, glass, fluorescent bulbs, paper, beverage containers, toner cartridges, electronic equipment
- ▶ "Paperless" environmental supported by Wausau ShopView™ software
- ▶ 100% VOC-capture spray painting of durable AAMA 2605-tested fluoropolymer
- ▶ No-VOC finish options: Powder coatings and durable Class I anodic finishes
- ▶ Resource-wasting internal rework minimized through Lean/Six Sigma



High-efficiency HVAC



Spectrally-selective glass

Sustainable Building Design Features

- ▶ Spectrally selective Viracon glass
- ▶ Thermal barrier Wausau window and curtainwall frames
- ▶ Use of recycled and regional content
- ▶ Natural landscaping, storm water management, and alternative transportation accommodations
- ▶ Low-flow plumbing fixtures
- ▶ High-efficiency HVAC designed to use air compressor waste heat
- ▶ White roof
- ▶ Tri-level lighting, with energy-saving lamps and ballasts
- ▶ Exterior lighting designed to prevent light pollution



CNC machining center

Sustainable Business Practices

- ▶ Leadership within industry trade organizations and research groups
- ▶ Design charrettes supported with pre-bid engineering
- ▶ All operable windows are durable, cycle-tested AW-Class
- ▶ LEED-GAs on staff
- ▶ Award-winning safety performance
- ▶ Extruded aluminum frames contain recycled content averaging 70% or greater

Choosing efficient windows for a commercial building can be difficult, using published U-Factor, Solar Heat Gain Coefficient, Visible Light Transmittance, and Condensation Resistance Factor, as relative importance depends on site- and building-specific variables.

Online Support - Innovative Products

Solar Control and Natural Daylighting

- ▶ ClearStory™ exterior sun shades and interior light shelves
- ▶ Between-glass Venetian blinds

Enhanced Energy Efficiency

- ▶ Triple glazing options
- ▶ Multi-level thermal barrier systems
- ▶ Polyamide thermal barrier curtainwall
- ▶ Enhanced condensation resistance
- ▶ HVAC cut-off switches for operable vents



Exterior sun shades and re-cladding



Interior light shelves



Photo-voltaics



Energy-efficient windows

Renewable Energy and Dynamic Glazing Demonstration Projects

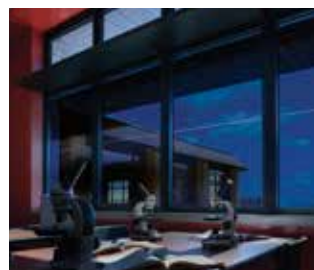
- ▶ Facade-integrated photo-voltaics
- ▶ Electrochromic SageGlass®
- ▶ Motorized vent operators

Renovation and Re-Use

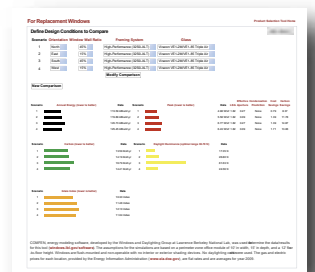
- ▶ Simulated double-hung projected windows
- ▶ Historically-accurate INvent Retro™
- ▶ Unitized curtainwall for re-cladding

Sustainable Design Tools at www.wausauwindow.com

- ▶ Performance upgrade tables for Wausau's standard products
- ▶ LEED criteria and rating systems
- ▶ LEED checklist and sample submittals
- ▶ Recycled, regional and innovative materials
- ▶ Potential credit contributions of windows and walls
- ▶ Supplemental guide specifications for LEED projects
- ▶ The Wausau Energy Modeling Tool



Electrochromic dynamic glass



Energy modeling tool

Wausau's Energy Modeling Tool* provides comparative **building energy** performance - annual energy use, peak demand, carbon emissions, daylight, glare, and condensation - to **optimize product selection**.

*Developed by the University of Minnesota Center for Sustainable Building Research. Simulations use COMFEN from Lawrence Berkeley National Labs' Windows and Daylighting Group



LEED® 2009 (Version 3) and LEED v4.0 for BUILDING DESIGN and CONSTRUCTION
- NEW CONSTRUCTION and MAJOR RENOVATIONS -
Wausau's Windows and Curtainwall Contribution to Credits

Credit Category	Credits Impacted by Wausau Products	Commentary
Integrative Process (IP)	IPc1 LEED v4.0 only Integrative Process	Available as an online support resource at www.wausauwindow.com . Wausau's Energy Modeling Tool Provides comparative building energy performance - annual energy use, peak demand, carbon emissions, daylight, glare and condensation - to optimize product selection. (Tool developed by the University of Minnesota Center for Sustainable Building Research. Simulations use COMPEN from Lawrence Berkeley National Laboratory's Windows and Daylighting Group.)
Location and Transportation (LT)	No direct impact	
Sustainable Sites (SS)	No direct impact	
Water Efficiency (WE)	No direct impact	
Energy and Atmosphere (EA)	1 Optimize Energy Performance	Wausau's products have long-standing recognition as some of the industry's best in energy performance. Combined with Viracon's high-performance glass, the "right" windows are always available for your building type and climate zone, including our extensive triple-glazed-capable product offering. Wausau Window and Wall Systems® INvent.PLUS™ operable and fixed windows offer European benchmark thermal performance, but with clean styling and narrow sightlines attuned to U.S. architectural preferences. Innovative composite framing design creates an American Architectural Manufacturers Association (AAMA) AW Class architectural window series with best-in-class R6 fixed and R5 operable performance. No-compromise product selection is made possible by a unique combination of 45% aluminum extrusions and 55% engineered polymers (by volume). Wausau's SuperWall™-XLT Series curtainwall incorporates composite fiberglass pressure plates for lower U-Factor and better condensation resistance, which is ideal for cold climates and high-humidity applications such as hospitals. Photovoltaic panels generate renewable electrical energy directly from sunlight, and can be readily integrated into building facades and skylights. Wausau was a pioneer in development of building-integrated photovoltaic (BIPV) facade systems in the U.S. Wausau SuperWall has been UL-listed as a BIPV system for several projects, and Wausau holds U.S. patent # 6,646,196 B2 "Window Structure with Photovoltaic Panel."
	2 On-Site Renewable Energy	
Materials and Resources (MR)	1.1 Building Re-Use - 75% and 1.2 95%	Wausau provides a complete line of replacement windows and panning for historic renovations, energy upgrades and buildings' re-use. The Custom Window™ by Wausau brand is recognized nationally for its historically accurate windows utilizing true-divided lite muntin grids. These windows are well suited for application in tax-credit-eligible historic districts, buildings listed on the National Register of Historic Places, or wherever thoughtful restoration is a design goal. Wausau SEAL™ interior accessory windows also improve sound, energy, air, and light control when existing single-glazed windows are left in place.
	4.1 Recycled Content 10% and 4.2 20%	Wausau products are fabricated from aluminum extrusions containing LEED-defined "combined" post-consumer and post-industrial recycled content of 42% to 69%. Glass, steel, and hardware components also contain high percentages of recycled or recyclable content.
	MRC2 LEED v4.0 only Building Product Disclosure and Optimization - Environmental Product Declarations (EPDs) MRC3 LEED v4.0 only Building Product Disclosure and Optimization - Sourcing of Raw Material MRC4 LEED v4.0 only Building Product Disclosure and Optimization - Material Ingredients	Pending revisions to the joint industry EarthSure PCR 30171600 "Window Product Category Rule (PCR)" for generation of manufacturer-specific EPDs, Wausau can provide industry-wide generic environmental profiles from www.quartzproject.org for anodized and PVDF-coated aluminum curtainwall extrusions, EPDM curtainwall sealgaskets and laminated glass. In some cases, EPDs for insulating glass units may also be available from the glass fabricator. <i>Note on Source: The Quartz Common Products Database is an open database of composition, health hazard and environmental impact data for building products, sponsored by the Healthy Building Network® thinkstep®, Google®, and Flux®.</i> Wausau's engineered windows, curtainwall, daylight control systems and accessories vary in composition and materials to meet each project's functional and aesthetic needs. For product selection purposes, a general self-declared Wausau Product Transparency Report is available, which lists ingredients used across all products and available options, with full disclosure of known hazards as identified in the Pharos online database. Pharos is a project of the Healthy Building Network, and is the tool employed by the Health Products Collaborative™ to generate Health Products Declarations.
Indoor Environmental Quality (EQ)	2 Increased Ventilation	Operable windows can be part of an effective natural ventilation strategy, when applied using the recommendations in the Carbon Trust "Good Practice Guide 237" [1998] and ASHRAE 62.1-2004. Wausau structurally glazed, operable window products such as INvent™ Series 4250i-VX, Visuline™ Series, and Zero-Sightline Series can provide "no-sap" performance even for oversized vents.
	4.1 Low-Emitting Materials - Adhesives and Sealants	All primers, structural glazing adhesives and metal-to-metal sealants recommended by Wausau for use on-site meet applicable volatile organic content (VOC) limits defined by the South Coast Air Quality Management District's (SCAQMD's) Rule #1168.
	6.2 Controllability of Systems - Thermal Comfort	Occupant-controlled operable windows may be used in lieu of comfort controls, as outlined in ASHRAE 62.1-2004.
	7.2 Thermal Comfort-Design	Wausau's products have long-standing recognition as some of the industry's best in energy performance. Combined with Viracon's high-performance glass, the "right" windows are always available for your building type and climate zone are always, including our extensive triple-glazed-capable product offering. When applied per ASHRAE Standard 55-2017 "Thermal Comfort for Human Occupancy," Wausau's window and curtainwall systems utilizing frame thermal barriers and warm-edge insulating glass can increase "mean radiant temperature" perceived by building occupants, compared to lower-performing systems. The low air infiltration of Wausau's AAMA AW Class-rated windows helps keep drafts to a minimum.
8.1 Daylight and Views 75% and 8.2 90%	Most of Wausau's products are available with between-glass Venetian blinds. In addition, Wausau ClearStory™ sun shades and light shelves help optimize natural daylighting and provide quality views without introducing glare or excessive heat gain.	
Innovation and Design Process (ID)	1.1 thru 1.4 Innovation in Design	Wausau's design engineers always are available via email and video conferencing for custom window and curtainwall consultation, charettes and analyses. Wausau designs and fabricates hundreds of new extrusion die profiles annually, while offering Revit™ models for standard products and project-specific Building Information Modeling (BIM). LEED Green Associates are on staff at Wausau to make your sustainable design vision a reality.
		Wausau engineers and fabricates most major projects at our LEED-Silver manufacturing center in Wausau, Wisconsin. In partnership with design teams, we continually strive to add value and improve upon previous success through efficient, environmentally responsible, health-conscious practices and protocols.

Chart updated August 2014 to include LEED v4.0 Note: Schools and healthcare facilities may have supplemental requirements and/or credit opportunities. Disclaimer: Wausau Window and Wall Systems take no responsibility for product selection or application, including, but not limited to, compliance with building codes, safety codes, laws, merchantability or fitness for a particular purpose; and further disclaims all liability for the use, in whole or in part, of the information contained herein in preparation of project specifications and/or other documents. This information and the products described are subject to change at any time, without notice, and at wausau's sole discretion. "INvent," "Visuline," "INvent.PLUS," "SuperWall," "Custom Window," and "ClearStory" are trademarks of Apogee Wausau Group. All rights reserved. ©2018 Apogee Wausau Group.

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Notes:

1. EO Credit 4.2 "Low-Emitting Material - Paints and Coatings" specifically exempts factory baked-on finishes such as fluropolymer, acrylic enamel and urethane paints. Residual VOC solvent content of these products is typically less than 0.3% after curing, hence they have no effect on indoor air quality.
2. MR Credits 5.1 and 5.2 "Regional Materials - 10% or 20% Extracted, Processed and Manufactured Regionally" has been revised in LEED® Version 2.2, to eliminate credit for any material that is not extracted or recovered within 500 miles of the site. Since the bauxite mined to make aluminum is 100% imported, no primary aluminum framing material qualifies. Recycled aluminum used by Wausau's Midwestern extruder-partners is cast into secondary extrusion billets in several locations. Most of these cast houses are within 500 miles of Wausau, Wisconsin, and if the job site is also within 500 miles, framing fabricated from recycled aluminum may help projects qualify for MR Credits 5.1 and 5.2. "Regional Materials." There are certain unusual situations where glass or other infills may help contribute. More information is available at www.viracon.com.



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