

# Walmart

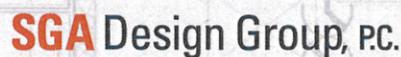
## Sustainable Design

*Our commitment to sustainability as a business practice continues to evolve, driving innovation into the design of our buildings and sites, and serving the communities in which we operate. We help people save money so they can live better.*



#2362

# South Euclid, OH



# LED Light Emitting Diodes

## 100% LED-Lit Store

We illuminate exterior parking lots, building signage, ceilings and all refrigerated cases with light emitting diodes (LED). LED technology is a solid-state lighting technology which saves energy, reduces maintenance and provides superior optics, improved lamination and better lighting distribution. LED does not require heating a filament to create light. Rather, electricity is passed through a chemical compound that is excited and generates light. LED technology contains no mercury or lead. We have been experimenting with LED technology in our stores for 10 years. What does this mean to you? Fewer power plants, fewer lamps in the landfill and lower costs.

## LED Refrigerated Lighting

In 2007, we began using LED technology to light refrigerated cases with doors. LED technology is more than 80% more efficient than equivalent fluorescent refrigerated case lights (with doors). Total estimated energy savings for LED lighting in an average Walmart grocery section is more than 59,000 kWh/year; enough energy to power five single-family homes. LED lights are projected to last at least six years beyond conventional lighting, reducing maintenance costs. In refrigerated food cases, LED performs well in the cold and produces less heat than fluorescent bulbs - heat which must be compensated for by the refrigeration equipment. Beyond our traditional LED lighting strategy for Walmart, LED lighting has been added to all refrigerated cases in this store. The additional LED lighting used in this location generates an added energy savings of more than 45,000 kWh/year over a prototypical store.

## LED Total Building Lighting

LED technology can provide more energy efficient operation than equivalent fluorescent fixtures. The total projected energy savings due to LED lighting in this building is over 100,000 kWh/year. The life span of LED lighting is projected to be at least six years beyond conventional fluorescent lighting, which must be relamped, on average, every three years. This life expectancy allows for a significant reduction in re-lamping and maintenance costs. We partnered with GE Lighting, located locally in NELA Park, to apply their Generation 1 LED fixture in a real-world test at this store. This test store enabled GE to improve their next-generation LED, which could be used on future Walmart projects, to be able to save almost 300,000 kWh/year.

## 100% LED-Lit Parking Lot Lighting

In 2010, after a DOE Partnership Demonstration project, we adopted the use of LED lighting for parking lots. LED fixtures provide noticeable reduction in both on and off-site glare, improvements in trespass control (off-site spill light), light uniformity, vertical illuminance, and car and face recognition. In addition to these benefits, because the LED systems can use less light and aim it more efficiently, energy consumption is projected to be reduced by a minimum of 50% when compared to the metal halide conventional light fixtures.

## LED Sales Floor Lighting

This unique store uses LED lighting for the sales floor in lieu of fluorescent lighting. We expect our experiment to yield an estimated savings of almost 80,000 kw/year for sales floor lighting alone, compared to a building and type of this size.



Receiving Dock LED Spot Light



LED Self Checkout Register Light



LED Refrigerated Lighting



LED Parking Lot Lighting

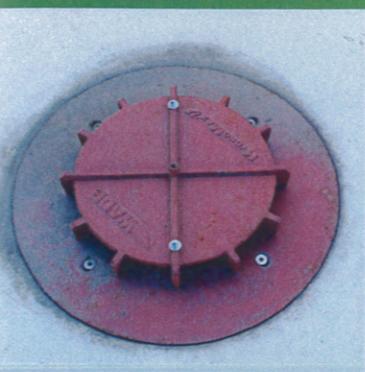


LED Sales Floor Lighting

# Building Systems



Secondary Loop Refrigeration



Siphonic Roof Drain



Modular Chiller



High Volume Low Velocity Fan

## CO<sub>2</sub> Low Temp & Glycol Medium Temp Secondary Loop Refrigeration

The secondary coolant refrigeration design reduces the amount of traditional Direct Expansion (DX) refrigerant used. CO<sub>2</sub> is used as secondary coolant for the low-temp applications, while glycol is used for the medium-temp applications.

## Siphonic Roof Drains

These drains utilize the power of a siphon to route water through smaller diameter pipes without a slope to the exterior of the building. Engineered roof drains eliminate air from the roof drain system, while the height of the building creates siphonic pressure. Smaller pipe diameters require less pipe material to be used. For example, pipes typically installed with a 12" diameter can now be replaced with 8" diameter pipe.

## High-Efficiency (HE) HVAC Equipment

We use some of the industry's most efficient heating, ventilating, and air-conditioning (HVAC) units available.

## Dehumidification

We actively dehumidify our new stores. Lower humidity allows the refrigeration system to operate more efficiently and mitigates condensation on refrigerated glass doors.

## Integrated Refrigeration & Heating System

Medium temperature refrigeration utilizes a secondary loop system driven by a modular chiller concept that both improves overall system efficiency and reduces the refrigerant charge by 90%. Waste energy from the refrigeration units is captured and utilized to preheat outdoor air for building ventilation.

## Common Loop Refrigeration Design

The low temperature refrigeration systems utilize a common loop design, wherein refrigeration from individual cases is piped into a common loop which then returns to the compressor suction inlet. This system reduces installed copper, and also reduces total refrigerant charge, thereby lowering the facility's CO<sub>2</sub> footprint. In addition, the refrigeration systems are mounted on the roof, as close as possible to the equipment they chill, further reducing the length of copper piping and total refrigerant charge.

## High Volume Low Velocity Fans

As in many Supercenters built in the last several years, the Garden Center in this store utilizes normal exhaust air from the store to keep associates comfortable at the checkout counters. This system uses cooler air that is normally exhausted to the outside to meet ventilation demand, and blows it directly on cashiers through adjustable fans.

## Doors on Medium Temp Refrigerated Cases

In most traditional grocery stores, products like prepackaged deli meats and cheeses, yogurts, beer, and many others can be found in open refrigerated cases. This store is testing doors on refrigerated cases to use less energy. Doors on cases can reduce the refrigeration load by 20% or more.



# Energy Conservation

## Daylight Harvesting

Many retail stores use overhead artificial light. During daytime hours, our stores replace artificial light with natural daylight. Hundreds of skylights, utilizing electronic continuous dimming technology, allow most of the overhead lights to dim and then turn off for many hours of most days. For a typical Walmart Supercenter, this reduces the amount of energy used to light the sales floor by 25%. Skylights, with continuous dimming technology, have been used in new Sam's Club stores since 1993, Walmart Supercenters since 1996, and Walmart stores since 2000.

## Motion Sensor Lighting

Lighting turns off automatically when no one is present. This reduces electricity usage and cooling loads. We install occupancy sensors in most non-sales areas as part of our standard prototype. The sensors automatically turn the lights off when the space is unoccupied. These areas include: our restrooms, break rooms and offices.

## Energy Management Systems

The heating, air conditioning, refrigeration, and lighting for nearly every location in the U.S. is controlled with a centralized energy management system (EMS). Our system operates 24-hours a day, seven days a week and allows us to monitor and adjust energy usage, temperatures, and lighting performance.

## Heat Reclamation

We reclaim waste heat from on-site refrigerant equipment to supply up to 60% of the hot water needs for newly constructed stores. Heat reclaim systems transfer waste heat from the refrigeration system to heat domestic hot water for restrooms and kitchen areas. During the winter, waste heat is also returned into the building to condition interior spaces.

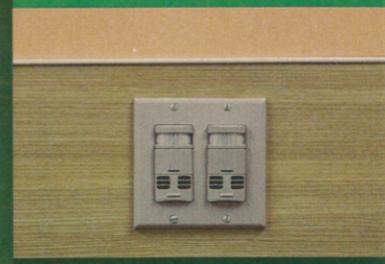
## High-Efficiency Design

This store utilizes a high-efficiency design. The refrigeration, HVAC, and lighting systems provide a total energy savings of up to 34% above the industry standard. These energy savings equate to the CO<sub>2</sub> emissions for the energy use of approximately 34 American homes in one year.

*\*Source: U.S. EPA Greenhouse Gas Equivalencies Calculator*



Skylights



Motion Sensor



Heat Reclamation



High-Efficiency Equipment



# Water Conservation

## High-Efficiency Urinals

In most newly remodeled and constructed stores, we install high-efficiency urinals that use only 1/8 gallon (one pint) of water per flush. The fixture reduces water use by 87% compared to the conventional one gallon per flush urinal.

## High-Efficiency Faucets

The restroom sinks in our new stores use sensor-activated 1/2 gallon per minute high-efficiency faucets. These faucets regulate water flow and reduce water usage by 75% compared to currently mandated 1992 EPA standards. During usage, water flows through turbines built into the faucets that generate electricity needed to operate the motion sensors. This saves energy as well as eliminating conduit and wiring to each fixture.

## High-Efficiency Toilets

The restroom toilets in our new stores are highly efficient and reduce water use. The fixture uses 20% less water compared to mandated EPA Standards, of 1.6 gallon per flush fixtures. The toilets utilize built-in water turbines to generate the power required to activate the flush mechanism. These turbines save energy and material by eliminating electrical conduits required to power automatic flush valve sensors.

## High-Efficiency Restroom Fixtures

It is estimated that our water conservation measures could save up to 574,000 gallons of water annually for this store.

## Low Flow Aerators

Lavatories and sinks use air induction technology to perform at a higher flow intensity than standard fixtures reducing the volume of water used.



High-Efficiency Urinal



High-Efficiency Faucet



High-Efficiency Toilet



*We have worked hard to build energy and water efficient buildings and sites for decades. We are continually looking for new and innovative ways to reduce energy and water consumption in all our facilities. By using new energy and water efficient technologies, Walmart is making its business model more sustainable while reducing its environmental footprint; truly a win-win.*

# Materials

## Air Quality



### Concrete Flooring

Walmart uses exposed concrete floors in newly constructed areas to reduce surface applied flooring materials. This minimizes or eliminates the need for many chemical cleaners, wax, and wax strippers. It also removes the need for propane-powered buffing in the sales areas.

### Low VOC Paints and Coatings

Volatile Organic Compounds (VOC) are gases emitted from certain solids or liquids, some of which may have short or long term adverse health effects. We have reduced the volatile organic compounds of interior field paint coatings by using better performing standard paint products with lower VOC content limits. The paints and coatings used in this store comply with Green Seal Standard GS-11 and South Coast Air Quality Management District (SCAQMD) Rule #1113, which are now the industry standards for low VOC paint and coating products.

### Construction Adhesives and Sealants

Our adhesives and sealants are designed to achieve maximum performance with minimum impact to the environment. They are solvent-free and are special low Volatile Organic Compound (VOC) formulations. All adhesives and sealants used in the construction of this store meet or exceed the requirements of the South Coast Air Quality Management District (SCAQMD) Rule #1168, the standard of measurement for products of this type.

### Flooring Systems

The commercial carpeting installed in this store was third-party verified by the Green Label Plus program developed by the Carpet and Rug Institute, which certifies the carpet and carpet cushion are among the lowest Volatile Organic Compound (VOC) emitting products available on the market. The PVC Plank flooring meets the stringent requirement criteria established by the Resilient Floor Covering Institute's FloorScore program's independent third-party certification.

### Ceiling and Wall Systems

All of the installed drywall and performance wallboards including sheathings, tile backers and underlayments have either no Volatile Organic Compounds (VOC) or have very low reportable VOC content. All insulation products contain no formaldehyde which has been widely used in these products. Acoustical ceiling tiles have high recycled content, are 100% recyclable, and also contain no added formaldehyde products. The wall coverings used throughout the store are no VOC and PVC free materials. Each of these products meet California's Special Environmental Requirements, which is the industry standard for environmentally responsible materials.

### White Roofs

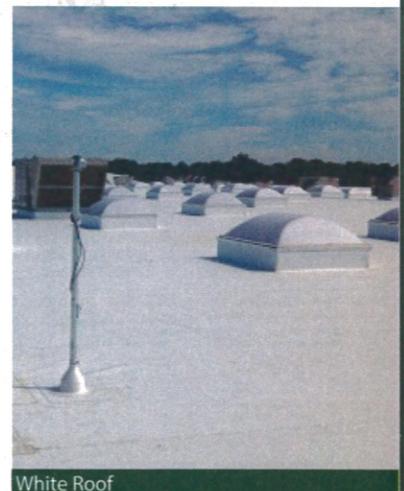
We use "white" membrane roofs on our newly constructed stores. With a higher reflectivity, white roofs help reduce building energy consumption in most climate zones and have a lower heat island effect than a darker roofing color. The roof has a Solar Reflectance Index (SRI) of greater than .65 with a 3-year aged reflectance of greater than .5. This allows the roof to reflect the sun's heat and keep it from being transmitted into the building, also reducing heat buildup by reflecting the sun's rays and not holding heat within the membrane. Membranes are heat welded and mechanically attached, eliminating the need for solvents. Additionally, low VOC adhesives and sealants are utilized where required.



Concrete Flooring



PVC Plank Flooring



White Roof

# Materials Recycling

## Recycled Construction Materials

We are reducing the amount of natural resources used in construction by replacing materials that generally create high amounts of greenhouse gases with waste products from a variety of industries.

All concrete for this store used mixes where cement was replaced with either 15-20% fly ash from coal-fired electrical generation waste, or 25-30% slag from steel manufacturing waste. Additionally, we use recycled content steel for interior and exterior metal studs, structural framing systems, and wall and foundation reinforcements.

## Recycled Plastic Baseboards

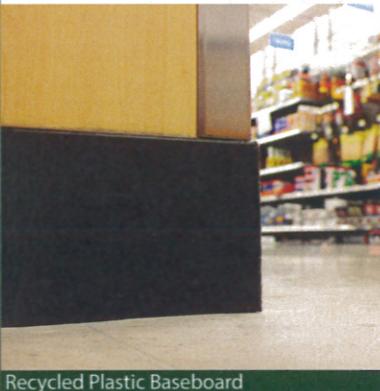
The plastic baseboards in this store are manufactured from 100% recycled resins. Using a proprietary technology, the manufacturer converts post-industrial scrap into USDA-accepted and American-manufactured material. Each baseboard piece is made of about 10 lbs. of non-biodegradable plastic diverted from landfills. The baseboards can be recycled if and when they are replaced in the future, encouraging a closed-loop recycling program. The product is also Greenguard Children and Schools certified for its low chemical emissions.

## Non-Fiberglass Reinforced Plastic

For many years, Fiberglass Reinforced Plastic (FRP) has been common in the construction industry, primarily where health codes require smooth and easily-cleanable surfaces. While tile can be used in these areas as well, it is often cost-prohibitive; often fiberglass panels were used instead. With the recent introduction of Non-fiberglass Reinforced Plastic (NRP), we changed our prototype construction specifications to include NRP. NRP is similar in performance, but does not contain fiberglass, and used or damaged panels can be recycled.



Recycled Slag & Fly Ash



Recycled Plastic Baseboard



Recycled Content Steel



*We leverage global presence and scale of impact to implement promising sustainable technologies that make environmental and economic sense. These opportunities vary from country to country, market to market, and even amongst store types and prototypes. Successful technologies are deployed into appropriate new store prototypes and remodel programs. These experiments complement sustainable practices found at many other Walmart and Sam's Club locations. This unique building and site incorporates innovative technologies that are currently being tested.*

# Waste Management Recycling



## Super Sandwich Bales

In 2007, Walmart integrated a Super Sandwich Bales (SSB) program into many of its stores. This process efficiently condenses large volumes of loose plastic, aluminum, paper, cardboard and many other recyclable materials into a single manageable bale that is easier to manage and more efficient to haul. The SSB bales are transported to a Material Recycling Facilities (MRF) for processing.

## Balers

In most of its stores, Walmart uses hydraulic presses called balers, which compress recyclable materials into dense cubes called bales. These bales can be made into Old Corrugated Containers (OCC) - cardboard and SSB. These bales are then transported to paper mills or to material recycling facilities (MRF) for processing.

## Compactors

Compactors are used in most stores to collect non-recyclable materials. These units use hydraulic rams to compress non-recyclable waste into a storage bin which is hauled to a landfill and emptied. Our goal is to send zero waste to landfills while maximizing all waste streams to their highest value by recycling as much as possible.

## Used Cooking Oil Recycling

Used cooking oil (UCO) from the Deli and Rotisserie areas is collected in an oil caddy and transferred to a secured storage tank located in the backroom of the store. When the tank is near capacity, a contracted rendering company removes the contents for recycling. UCO can be used as a fuel and its sale can generate income for the store.

## Food Scrap

Food scrap, often referred to as organic waste, is separated from other discarded items and depending on quality is either sent to a food bank or sent to a third-party processor. These materials have beneficial reuse/recycling value and can be used for animal feed, can be processed through anaerobic digestion to produce energy or can be composted.

## Used Motor Oil and Filter Recycling

Many Walmart stores recycle oil and oil filters returned by customers. Motor oil has beneficial reuse value and is cleaned and used again in lubricating oils that meet the same specifications as non-recycled motor oil. Also some used oils are reused in special furnaces for heat or used in power plants to generate electricity. Refining used motor oil takes only one-third of the energy required for refining crude oil to lubricant quality, and one gallon of used motor oil that is re-refined will produce 2.5 quarts of lubricating oil, but it takes 42 gallons of crude oil to produce the same 2.5 quarts of lubricating oil. Oil filters are made of steel, which is the most recycled material in North America.

## Construction and Demolition Recycling

The goal of our Construction and Demolition (C&D) program is to capture and recycle as many metals, woods, plastics, floor and ceiling tiles, concretes, asphalts and other materials generated as part of our demolition and construction process as possible. We work with a waste management company to fully research all available C&D recycling facilities in the area where construction activities occur and provide a system designed to capture the widest possible range of materials recovery options for that particular location and type of construction. Construction waste materials from this store were separated by the General Contractor and processed off-site by a third party. Concrete, metals, cardboard, wood and plastics were separated from the remaining trash. Concrete products are typically crushed for use as building materials. Metals and cardboard are typically sent to recycling plants to become other products. Wood is typically recycled as mulch and plastics are used to create other new plastic products. This project diverted over 90% of construction and demolition debris from disposal in landfills and incinerators, and redirected reusable and recyclable materials to the appropriate sites.



Used Cooking Oil Tank



Compactor



Baler



C&D Recycling