

ROOF HUGGER[®]
Patented

ECO-Fit



**Energy Efficient
Re-roofing
Technologies
that Turn an
Expense into
an Investment**

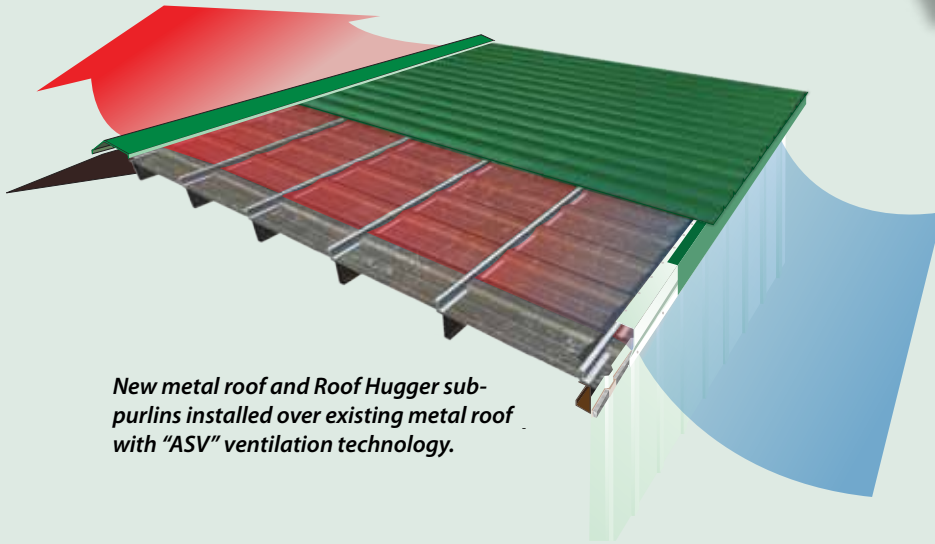


ROOF HUGGER®

Patented

ENERGY EFFICIENT RE-ROOFING

The Roof Hugger® "Nested" sub-purlin is a patented design that is manufactured to accommodate any roof profile regardless of panel depth or major/minor rib spacing. The new roof assembly can include added insulation, ventilation and/or solar thermal and power renewable energy systems.



New metal roof and Roof Hugger sub-purlins installed over existing metal roof with "ASV" ventilation technology.

The Above Sheathing Ventilation (ASV) System

SYSTEM DYNAMICS

How do "ASV" systems work? Fresh air is introduced to the cavity between the old and new roofs through ventilation at the low-eave of the building. When the sun heats the new metal roof, the cavity air becomes less dense. Because of this, the air becomes more buoyant and therefore begins to move upward at the immediate underside of the new metal roof. The air is then exhausted at the high point of the roof (ridge, etc.) through convection. The end result is the system creates an insulating barrier of air between the two roofs.

Many ventilation products are available that accommodate these applications and the system has the natural ability to dissipate any moisture caused by condensation as well as aiding in the elimination of mold growth.

SYSTEM PERFORMANCE

The "ASV" system has been tested under real-world conditions at Oak Ridge National Laboratories in Oak Ridge, Tennessee. Results indicate that the system reduces the heat radiation through the roof assembly a minimum of 30% and as much as 45% when a new roof is installed that has a "Cool" rated coating. In addition, this cavity air represents an R-Value of 0.85 per 1" of depth, thus increasing the overall roof assembly's thermal resistance. Depending on the profile of the existing roof, most cavities are no more than two-inches deep. To increase the energy efficiency even more, rigid or fiberglass insulation can be added to the cavity, but it is important to note that a minimum of 1" must be provided above the insulation to allow for adequate airflow. In some cases, a simple radiant barrier can be installed atop the existing roof to increase the assembly's energy efficiency.

Effectively, an "ASV" system reduces heat gain in the summer and heat loss in the winter.



New metal roof and Roof Hugger sub-purlins installed over existing metal roof and "ASV" air-space above new fiberglass insulation.



Roof Hugger sub-purlins prepared with air-circulation holes for un-insulated "ASV" application.

The Solar Thermal Water Heating (SWH) System

SYSTEM DYNAMICS

How do "SWH" systems work? When the sun heats the new metal roof, the air-space between the old and new roofs is heated, on the average, 50-plus degrees more than the outside air temperature. When this happens, the flexible tubing that is installed directly beneath the new roof is also heated. This tubing is filled with a water and glycol fluid that is heated by solar energy. The heated fluid is then circulated by pumps and used to heat water in storage tanks or for space or process heating. In new construction, the solar heated fluids can be distributed directly to in-floor radiant heating systems. Each system is specifically engineered to suit your building's requirements by Dawn Solar Systems (www.dawnsolar.com).

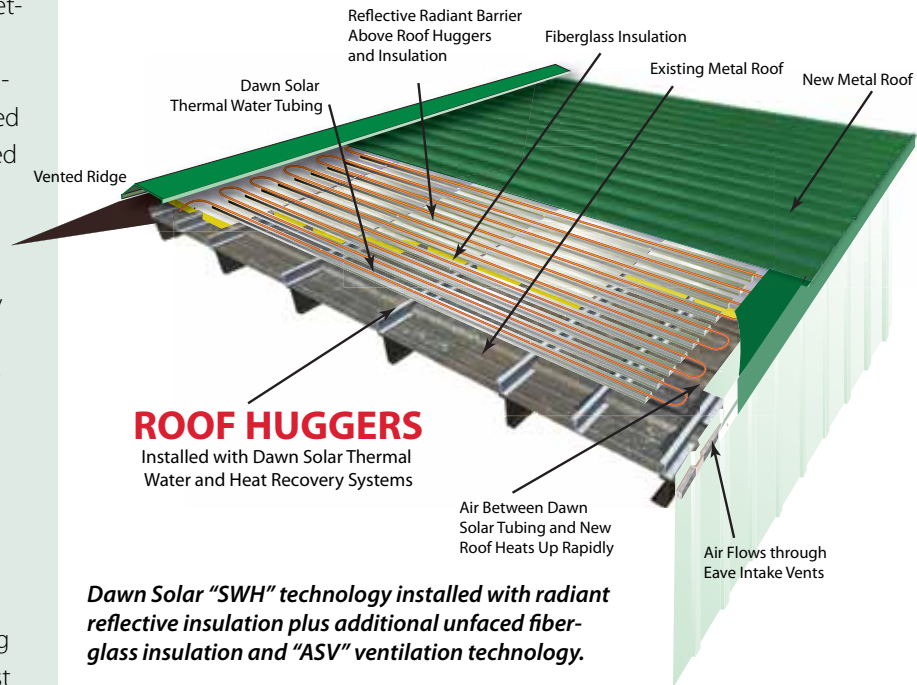
SYSTEM PERFORMANCE

Depending on the profile of the existing roof, most cavities between the old and new roofs are no more than two-inches deep. To increase the energy efficiency even more, rigid or fiberglass insulation can be added to the cavity while providing the air space above. This allows you to reduce your energy cost even more so while upgrading your building roof to current Model Energy Codes.

As with all solar energy systems, efficiency is based on several factors. These include the geographical location of the building, the roof's southern exposure to the sun and shading of the roof due to foliage or other buildings as well as other specifics. **"SWH" system case studies and cost benefit analysis have reported a return on investment to the building owner in four to six years using the energy consumption decrease and eligible tax incentives.** To determine if your building is a good candidate, contact Roof Hugger for a "Cost Benefit Analysis".

The Solar (PV) System

Many new metal roofs systems are the ideal platform to install renewable Photovoltaic (PV) energy systems that convert sunlight into electricity. These systems are available for surface mounted installations using attachment hardware or in a thin-film laminated version that adheres directly to the flat portion of the new metal roof. They are highly efficient and in many cases can be designed to satisfy the building's entire electrical demand or even greater in order to return the power to the commercial electrical grid.



Dawn Solar "SWH" technology installed with radiant reflective insulation plus additional unfaced fiberglass insulation and "ASV" ventilation technology.



Actual construction of a "SWH" system over a metal roof with fiberglass insulation between the existing metal roof and bottom of solar tubing. New roof panels are being installed.



A Solar Photovoltaic (PV) energy system installed over a metal roof.

The Solar Heat Recovery System(SHR)

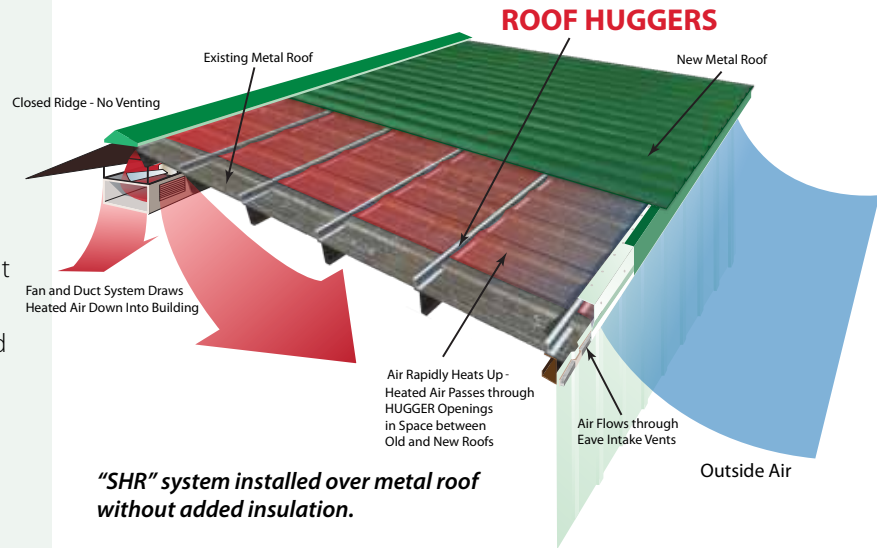
SYSTEM DYNAMICS

How do "SHR" systems work? Fresh air is introduced to the cavity between the old and new roofs through ventilation at the low-eave of the building. When the sun heats the new metal roof, the cavity air is facilitated through solar-powered fans and re-distributed through new ductwork to the existing HVAC system. The system is specifically engineered to suit your building's requirements by Dawn Solar Systems. Many ventilation products are available that accommodate these applications and the system has the natural ability to dissipate any moisture caused by condensation as well as aiding in the elimination of mold growth.

SYSTEM PERFORMANCE

Depending on the profile of the existing roof, most cavities between the old and new roofs are no more than two-inches deep. To increase the energy efficiency even more, rigid or fiberglass insulation can be added to the cavity while providing the air space above. This allows you to reduce your energy cost even more so while upgrading your building roof to current Model Energy Codes.

As with all solar energy systems, efficiency is based on several factors. These include the geographical location of the building, the roof's southern exposure to the sun and shading of the roof due to foliage or other buildings as well as other specifics. **"SHR" system case studies have reported from \$1.00 to \$1.50 per square foot of building floor space per year in energy savings.** To determine if your building is a good candidate, contact **ROOF HUGGER** for a "Cost Benefit Analysis".



Tax Benefits

Under the conditions of the Energy Policy Act of 2005 and the more recent American Recovery and Reinvestment Act of 2009 (a.k.a. Stimulus Bill), commercial buildings that improve their energy efficiency are eligible for tax benefits as allowed by Section 179D of U.S. Tax Code. For the "ASV" and Insulated systems described in this brochure, these benefits were extended through December 31, 2013 as a result of the Economic Stabilization Act of 2008. For buildings that reduce energy consumption a minimum of 16 2/3% and not more than 50%, a tax deduction of 60 cents per square foot of building floor area (maximum \$1500) is available. For the "SWH", "PV" and "SHR" renewable energy solar based systems, dollar-for-dollar tax credits have been extended for projects completed prior to January 1, 2017. The total unlimited credit equates to 30% of the in-place cost of the system (roof panels, sub-purlins and solar equipment including labor). In addition, these installations are eligible for IRS Bonus Depreciation, which allows 50% the first year and the balance over the following five years. Depending on the State your project is located, a multitude of Loan Guarantees/ Funding, Grants, Renewable Energy Bonds and Tax programs may be available. Consult your Tax Professional for specific details.

Retrofit Re-roofing can be Green AND Economical with HUGGERS!

The BEST way to RE-ROOF!

- INCREASE INSULATION FOR GREATER ENERGY EFFICIENCY
- MANY SYSTEMS AVAILABLE FOR FEDERAL AND LOCAL TAX INCENTIVES
- NO LABOR COST TO TEAR OFF OLD ROOF
- NO DUMPING OF OLD ROOFING MATERIALS
- NO DISRUPTION OF YOUR BUSINESS
- INCREASE WIND OR PURLIN CAPACITY TO MEET NEW CODE
- EASY UPGRADE TO STANDING SEAM ROOFS



The Leader in Energy Efficient Retrofit Re-roofing Systems

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