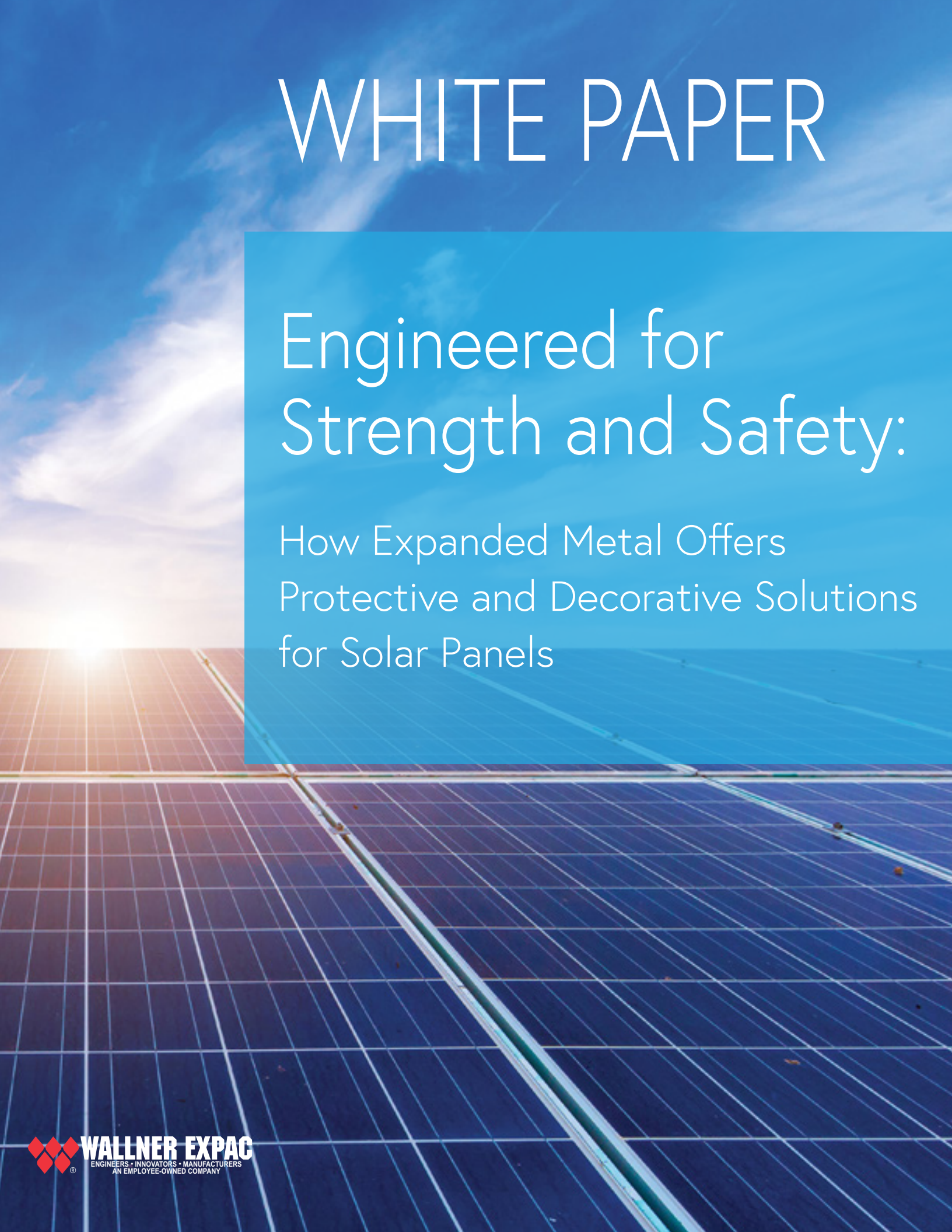
WHITE PAPER

Engineered for Strength and Safety:

How Expanded Metal Offers Protective and Decorative Solutions for Solar Panels



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OVERVIEW

According to the Office of Energy Efficiency & Renewable Energy, since 2010, the average cost of solar PV panels has dropped more than 60% and the cost of a solar electric system has dropped by about 50%. With the costs to go solar continually decreasing– and the availability of Federal tax credits– using solar power to supplement or even replace then need for purchased electricity is now a reality.

Even though the costs to go solar continue to drop, a home-owner can expect to pay approximately $25,000 for a 10kW solar panel system. To keep the system in top shape, pre-ventive maintenance is required. A poorly maintained array can not only reduce its efficiency, but produce unforeseen risks.

A commonly overlooked preventative measure is to install a protective skirting around the base of the panels and this paper will discuss the risks and associated costs when one is not used. Although there are different types of screens that can be used, this report will further demonstrate how expanded metal is an excellent choice to protect, safe-guard, and in some cases, comply with local regulations.

DAMAGE FROM INVASIVE ANIMALS

The space between the panel and the roof provides a safe haven for birds, squirrels, and other rodents from predators and extreme weather conditions. Pigeons quickly create mess of feathers, droppings, and nesting materials. Allowed to accumulate, this can cause rainwater to pool, which can lead to damage to the roof and ceilings.

Unlike pigeons, rats and squirrels prefer to gnaw on wiring. Compromised wiring can arc and short circuit the panel or the entire array. An abandoned nest– if allowed to come in contact with the frayed wires can easily ignite.

Animals can also scratch the panels, causing further damage.

DANGERS FROM WINDBLOWN DEBRIS

Since the space between solar panels and the roof is small, windblown debris such as leaves, pine needles, or plastic bags can easily accumulate, posing a fire risk. Think of kindling for a fire: The more you have, the easier it is to ignite.

A mass of windblown debris can also act as a dam. As it rains or snow melts, pools of water can form behind the debris. As with pigeon nests, this can lead to rooftop and ceiling damage not limited to leaks or even roof rot.

CIVIL IMPLICATIONS

Home owner associations cannot restrict homeowners from adding solar panels; however, they can mandate that the panels meet architectural requirements. As homeowners in HOAs submit requests to add solar panels to their roof, they are discovering that more and more HOAs now require skirting around the base.

The justification for this requirement is twofold: Aesthetics and the safety of all community residents. HOAs claim that the space between the panels and the roof is unsightly and can diminish the overall look of the community. They will also cite

Ground-mounted array with protective expanded metal screening

"[The] Area between the roof and the panels shall be skirted and painted in a color that matches the roof color."

that the space can allow wind-borne leaves, nesting birds, and debris to accumulate, thus making the community unattractive or even dangerous. For condominiums or townhomes, this is extremely important as a rooftop fire caused from accrued debris under the panels can quickly spread to multiple units.

COSTS FROM ANIMALS, DEBRIS, AND ASSESSMENTS

Repairs to damage caused by animals or debris can be substantial:

- The average cost to hire an animal control service to remove an animal is $300, with most homeowners spending between $168 and $431.
- To have one solar panel repaired, the average reported cost is $572, with most homeowners spending between $174 and $977.
- The average cost to repair a roof cost $681, with most homeowners spending between $316 and $1,061.

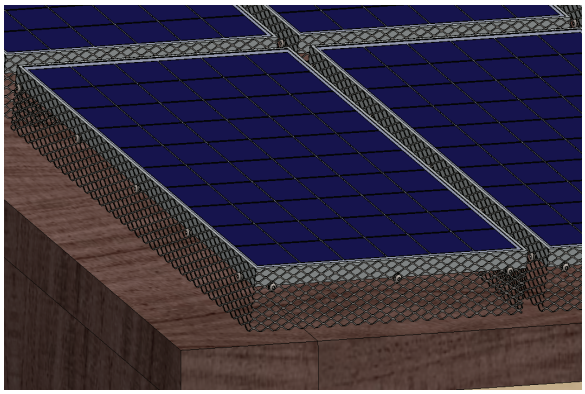
To repair the wiring or roof, the panel(s) will most likely need to be removed, which will need to be performed by a professional. If the damage to the panel is severe, it may need to be replaced– and may not be covered by an insurance policy.

The consequences of not skirting solar panels can also be punitive. For association homeowners, HOAs will levy fines for noncompliance. Almost all HOAs have the power to place a lien on the homeowner's property if the property owner becomes delinquent in paying levied fines. In extreme cases it may foreclose on that lien as permitted by the CC&Rs and state law.

PROTECT, SAFEGUARD, AND COMPLY WITH EXPANDED METAL

Expanded metal can fulfill all three of these requirements. Currently, most screens are made from woven or welded wire that has extremely small openings to prevent birds and vermin from invading the space. Both of these screens are readily available at many home improvement stores and may be available in different colors– namely black or green. The downside for using woven wire is that it is relatively thin, so a rodent that is determined to gnaw through may ultimately succeed.

An overlooked and superior alternative to woven or welded wire is expanded metal. Formed from a solid sheet of metal using a Shear-Form℠ process, it is fed under a set of knives, is slit and stretched, and



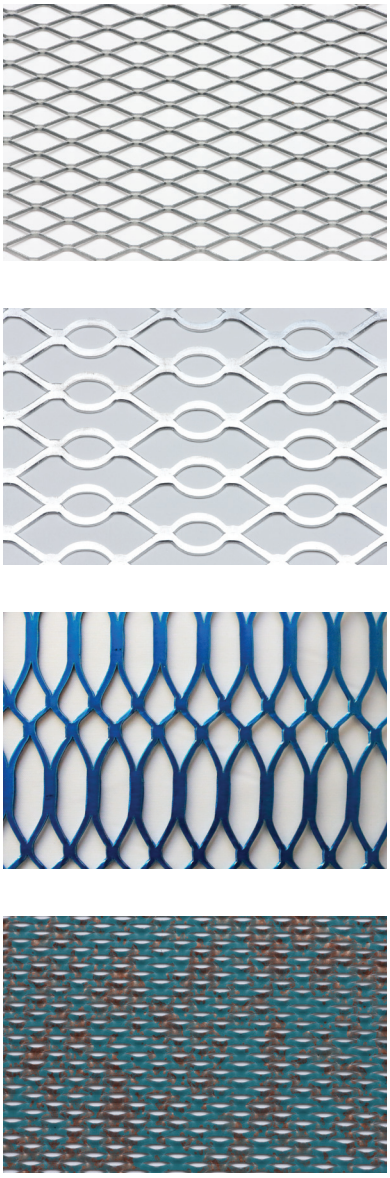
Engineering rendering of protective expanded metal skirting for solar panels

produces a uniform diamond patterned mesh that has a very high strength-to-weight ratio. Unlike woven or welded wire, there are no points at which the material can fray or separate. It can be made from galvanized steel, stainless steel, or other corrosion-resistant metal and due to its inherent single-piece architecture, it is extremely strong and will stand up to the elements.
The openings of the diamonds can be customized to allow for maximum air to circulate beneath the panels while protecting from animals, and safe-guarding from wind-borne debris.

A distinct advantage for using expanded metal is the availability of multiple patterns and colors. Welded or woven wire is limited to either a square or rectangle pattern. Not limited to a diamond-shaped pattern, expanded metal can be formed into many designs that can complement existing architectural elements– such as gutter guards, chimney caps, building facades, and skylight screens. It can also be painted– or even powder coated during the manufacturing process– helping to ensure compliance with HOA covenants.

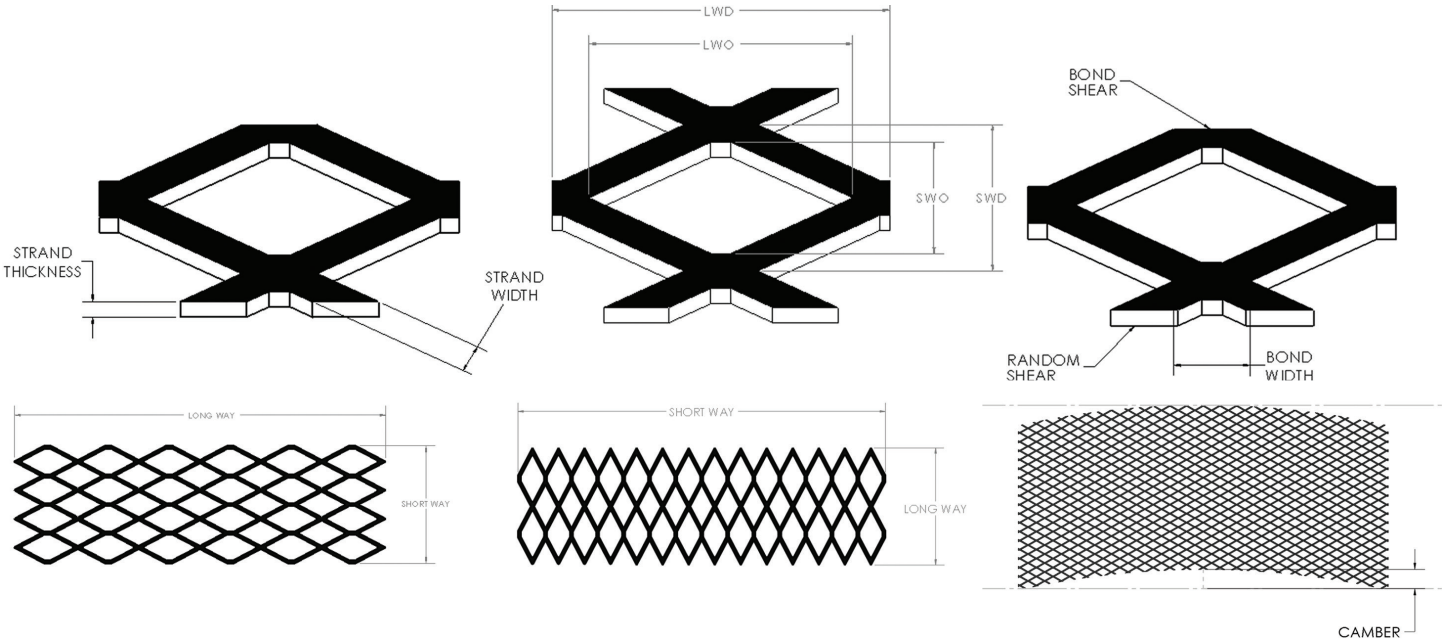
FINAL THOUGHTS

Solar panels will continue to be an important and beneficial option for new home and building construction. Engineered for strength and safety, expanded metal is the leading choice to protect and safeguard your solar panel–and when required– help comply with community regulations.



Examples of expanded metal patterns and finishes

EXPANDED METAL TERMINOLOGY



LWD
"Long Way of Diamond/Design" dimension

LWO
"Long Way of Opening" dimension
Used to indicate clear opening in the long direction

STRAND THICKNESS
Equal to the thickness of the sheet metal being used

BOND SHEARED
Where two strands intersect
Eliminates prongs or jagged edges

RANDOM SHEAR
Shearing that leaves prongs or jagged edges

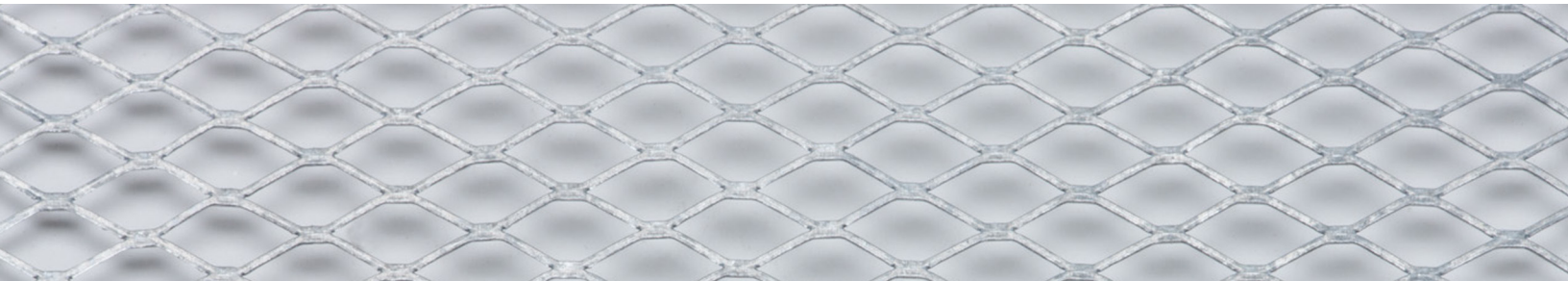
SWD
"Short Way of Diamond/Design" dimension

SWO
"Short Way of Opening" dimension
Used to indicate clear opening in the short direction

STRAND WIDTH
The amount of metal fed under the dies to produce one strand

BOND WIDTH
The width of two intersecting strands

CAMBER
The maximum distance between the edge of the expanded metal and the straight edge



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ABOUT WALLNER EXPAC

Wallner Expac is an employee-owned company and North America's largest manufacturer of light gauge expanded metals for filtraton- and also manufacturers expanded metal for many industries and uses. Since 1959, it has evolved from a simple shop to a state-of-the-art, world class manufacturing entity with facilities in Georgia, El Paso, and headquarters in Ontario, California.

Wallner Expac is the founder and leader in the manufacturing of expanded metal used in pleated filters. Since its introduction in 1976, these applications replaced the need for welded wire and distinguished Wallner Expac as an industry leader and innovator. Continuing to bring innovative products to market, Wallner Expac introduced X-Mesh®, the industry standard in filter media backing. Awarded U.S. Patent No. 8,696,781 for X-Mesh®, it is available in various specifications to meet individual needs. For more information on Wallner Expac, contact (909) 481-8800 or visit www.expac.com.

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