

# LIGHTPAINTINGS

## Use Industrial Fasteners

Artist Stephen Knapp builds his unique sculptures using PEM® Hardware.

Artist Stephen Knapp has taken the concept of light-paintings and light sculptures to unprecedented levels with stunning, large-scale works incorporating light, glass, stainless steel, and cables. With 30 years' experience in architectural art installations, Knapp combines his skills as an artist with a working knowledge both of space and potential to develop mixed media creations hailed as "the first new art form of the 21st Century."

From a purely practical perspective, the artist's massive lightpaintings can create daunting challenges both



in assembly and transport. Making his works both secure and safe, he favors attachment of glass panels utilizing stainless brackets (instead of clamps and silicon). Clinch fasteners permanently installed in the brackets serve with mating screws as attaching hardware. The artist selects PEM® self-clinching thru-hole threaded stainless steel standoffs from PennEngineering® Fastening Technologies for the work.

"The mechanical solution of brackets and fasteners is my preferred choice to attach lightpainting glass panels," Knapp says. "They yield a reliable and proper assembly that cannot be achieved otherwise."

One of Knapp's recently designed and highly praised lightpaintings features 31 coated panes of laminated glass, each held together by brackets with installed PEM standoffs. The fasteners "act as channels," protruding through holes drilled in the glass panes and accommodating mating screws to complete the attachment process.

"While glass-industry fasteners solely could have been used, they generally are too large and cumbersome," Knapp notes. "This method offered a practical and elegant solution."

He adds that PEM standoffs enable disassembly (and re-assembly) when artworks must be shipped to their permanent locations or travel to the growing number of exhibitions where Knapp's creations have begun to receive extensive public exposure.

"The installed hardware remains intact, which is especially critical in this situation," Knapp confirms. "The effects of loose hardware scratching the glass in itself would prove disastrous."

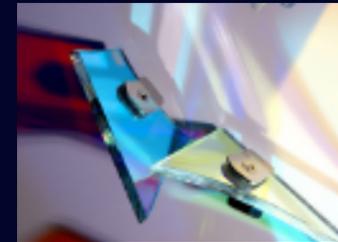
An initially unexpected, but welcomed, visual benefit resulted from the artist's ability to incorporate reflected light from the brackets and fasteners to contribute to enhanced aesthetics. "The joining method fully joins in the context of my creations," he reports.

PEM self-clinching standoffs (Type SO4) are manufactured from 400 Series stainless steel and can be installed in stainless sheets (or, in this instance, stainless brackets) with a hardness of 88 or less on the Rockwell "B" scale.

The fasteners (thread size #10-32) are inserted by Knapp's fabricator into drilled round holes in each bracket and then permanently mounted utilizing a squeezing force from a standard press. The standoff's head becomes embedded flush in the bracket upon installation for a clean look.

Performance data meet Knapp's requirements for fastener reliability in service. The standoffs can handle pushout forces up to 900 lbs., torque-out forces up to 71 in.-lbs., and pull-thru forces exceeding 1300 lbs.

While Knapp's application for PEM clinch fasteners



may be unique and unusual, it drives home many of the benefits long recognized by designers in a wide range of industries. And, whenever clinch hardware is specified to provide strong, reliable, permanent, and reusable threads in an assembly, users (whether in art or industry) can derive production and performance benefits over and above their intrinsic attachment value.

Underscored by Knapp's experience, self-clinching fasteners can eliminate a need for washers, lock washers, and nuts for final attachment of components. Since they become an integral part of an assembly in which they are installed and reduce the amount of hardware to handle and inventory, self-clinching fasteners promote quick

assembly and reduced costs.

An acknowledged expert in his field and author of "The Art of Glass," Knapp's innovative use of glass and light has established new standards for the evolving medium. Throughout his career, Knapp acknowledges certain constants: passion for his art; curiosity for the new; continuing research into materials; and a commitment to the techniques and processes involved in executing his ideas.

"The PEM clinch hardware," he adds, "works together to dramatic effect with all aspects of my creations."

For information:

PennEngineering® Fastening Technologies: [www.pennfast.com](http://www.pennfast.com)

Stephen Knapp: [www.lightpaintings.com](http://www.lightpaintings.com)