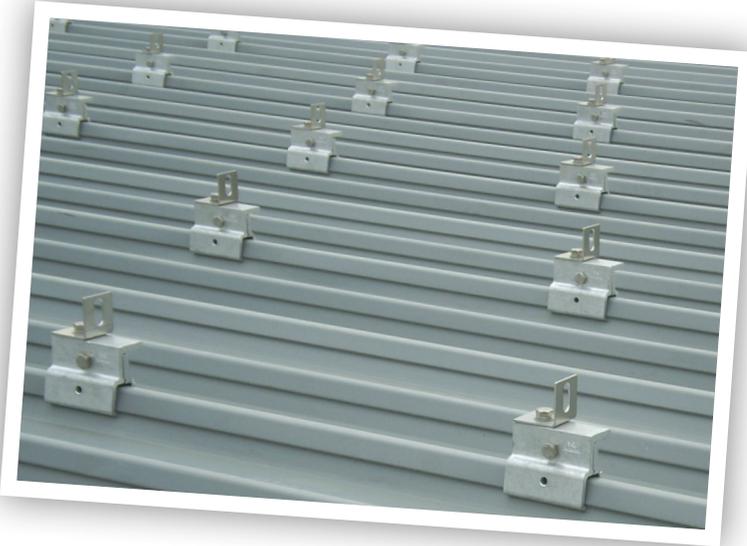


“ ... the technical challenges and safety concerns were met with enthusiasm and resolve... an excellent effort! ”

Stephen Keane  
Lonza Project Manager



The S-5-K provides a strong attachment solution without piercing the roof panel!

### ■ Finding a Way

Leading Swiss pharmaceuticals manufacturer Lonza Biologics (Lonza) pioneered the installation of solar PV for industrial buildings in Singapore, soliciting the help of S-5! distributor, Singapore-based Phoenix Solar to design and install Singapore's largest solar PV system as of June 2009.

Lonza's Admin Office & Lab roof provided prominent visibility as well as good exposure to the sun. However, the variable slope posed several design and safety challenges. Phoenix Solar's solution was to install a combination of high quality framed and frameless multi-crystalline modules using S-5! patented penetration-free clamps.

### ■ What Worked?

In choosing this roof for PV modules there were several key criteria to satisfy. The PV modules had to seamlessly follow the profile of the existing roof and roof penetrations had to be eliminated to prevent potential leakage. Phoenix Solar chose to use the S-5-K clamp, specially designed and engineered for Klip-Lok® roofs, the most popular metal roof formats for industrial buildings in Singapore.

The S-5-K clamps attach to the standing seam of the metal roof without piercing the panel, and therefore do not compromise water tightness. The S-5-K clamps were also used for fall protection, enabling the securing of permanent base plates and sockets for the fall protection barrier.

### ■ Long Term Outlook

The result was an aesthetically pleasing solution that seamlessly follows the sloping roof's profile while improving water run-off. The collaborative effort of the project team resulted in a highly visible solution that showcases innovative application of technical, construction and attachment techniques. S-5! distributor, Phoenix Solar, was recognized with Solar Pioneer Awards at a ceremony hosted by Singapore's Economic Development Board (EDB). S-5! was grateful to have been a part of this innovative success.

## At A Glance:

**Customer:**

Lonza Biologics  
Phoenix Solar



**Location:**

Tuas, Singapore

**Industry:**

Biopharmaceutical Products

**Situation:**

A variable sloping roof with only minor side edging and freefalls off the frontal edge presented a challenge to installation of PV modules. Requirements were zero penetration of the roof surface and adherence to the aesthetically pleasing roof flow.

**Results:**

The use of S-5! clamps led to a fast and economical transition to solar technology, one of Singapore's largest solar PV systems.

**Stats:**

- 2,000 m<sup>2</sup> of roof
- 848 Total Installed Solar Panels
- 181 kWp