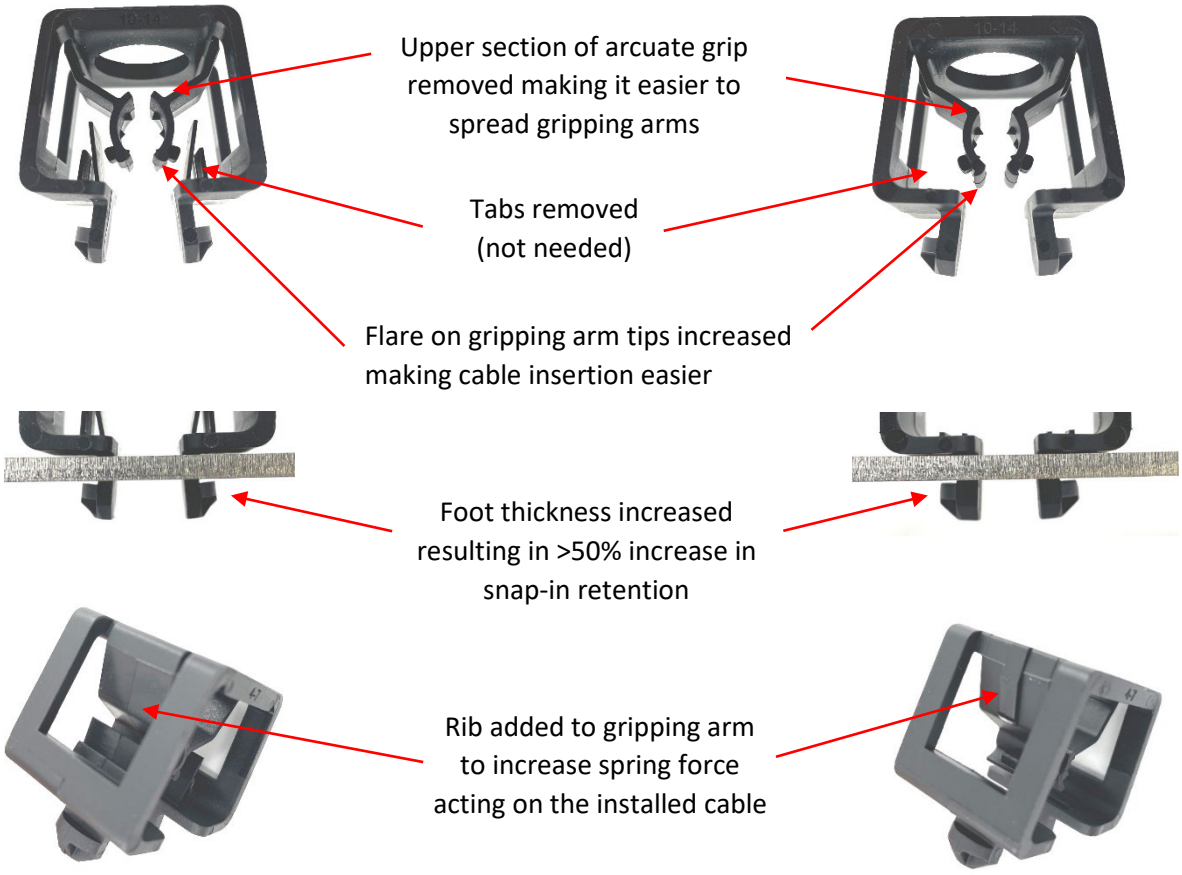
PIM Shield Plastic Snap-in (PSPS) - design improvements

Introduction

ConcealFab introduced PIM Shield Plastic Snap-ins in April 2020. These all-plastic cable hangers provide a low PIM method to secure cables ranging in diameter from 4 mm (fiber jumper cables) to 17 mm (RF jumper cables) in the high-risk PIM zone near antennas.

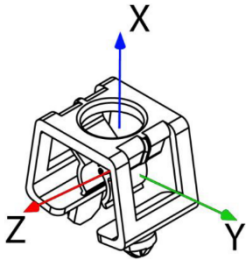
In April 2022, ConcealFab received notice from a customer that the tabs protruding from the snap-in arm would break occasionally when securing LDF4 cable (15.8mm). ConcealFab's partner, FIMO, performed pull tests on snap-ins with broken tabs and discovered that even with the tab missing, the parts exceeded design requirements! As corrective action for the breakage issue, the plastic snap-ins were re-designed to remove the tabs. While making this design modification, additional improvements were incorporated as described below:

Original Design: **Improved Design:**



Test Results:

Pull tests were conducted on the new snap-in design using a Lloyd Model LS 5 tensile testing machine (1000 N max pull capability) at 25°, 35% RH. Cables were inserted into the snap-in and the snap-in was installed in a ¾-inch diameter mounting hole. Pull tests were conducted in three directions to measure snap-in retention (X-axis), side wind load (Y-axis) and cable slippage (Z-axis). The PSPS-1417-10 snap-in was used for these tests with 14mm and 17mm cables to simulate worst case loading conditions.



Z- Axis test: (cable slippage)

The new snap-in design can support > 10x the weight of a 1m section of cable before slipping.

ARTICLE	PULLING SPEED	CABLE	NR OF SAMPLES TESTED (*)	CABLE WEIGHT	MAX LOAD ADMITTED (FZ) (AVERAGE)	SECURITY FACTOR K
PSPS-1417-10	50 mm/min	Ø 14 mm	25	290 g/m	32 N	11
PSPS-1417-10	50 mm/min	Ø 17 mm	25	415 g/m	78 N	19

Y- Axis test: (side wind load)

The new snap-in design can support the side wind load acting on 1m lengths of 17mm diameter cable with 0.3mm radial ice at wind speeds >300 km/hr. (186 mph).

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ARTICLE	PULLING SPEED	STACK	NR OF SAMPLES TESTED	MAX LOAD ADMITTED (FY) (AVERAGE)
PSPS-1417-10	50 mm/min	X 1	10	650 N
PSPS-1417-10	50 mm/min	X 2	10	201 N
PSPS-1417-10	50 mm/min	X 3	10	156 N

Calc. Load (300 km/hr)
80 N
103 N
140 N

X- Axis test: (snap-in retention)

Snap-in retention exceeded the pull capability of the Lloyd tensile tester.

ARTICLE	PULLING SPEED	NR OF SAMPLES TESTED	MAX LOAD ADMITTED (FX) (AVERAGE)
PSPS-1417-10	50 mm/min	10	>1000 N

Part Numbers:

ConcealFab will keep the original part numbers for its four plastic snap-in models since interchangeability (fit, form and function) is maintained with the improved design.

PSPS-0407-10
4 mm to 7 mm
cable diameter

PSPS-0710-10
7 mm to 10 mm
cable diameter

PSPS-1014-10
10 mm to 14 mm
cable diameter

PSPS-1417-10
14 mm to 17 mm
cable diameter

Product Pricing and Delivery

There is no price change associated with the improved snap-in design. All PIM Shield Plastic Snap-in shipments from ConcealFab after 8-1-22 will be the new design configuration.