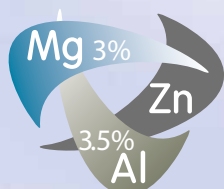


HOOKS FOR PROFESSIONALS

vi
value impex

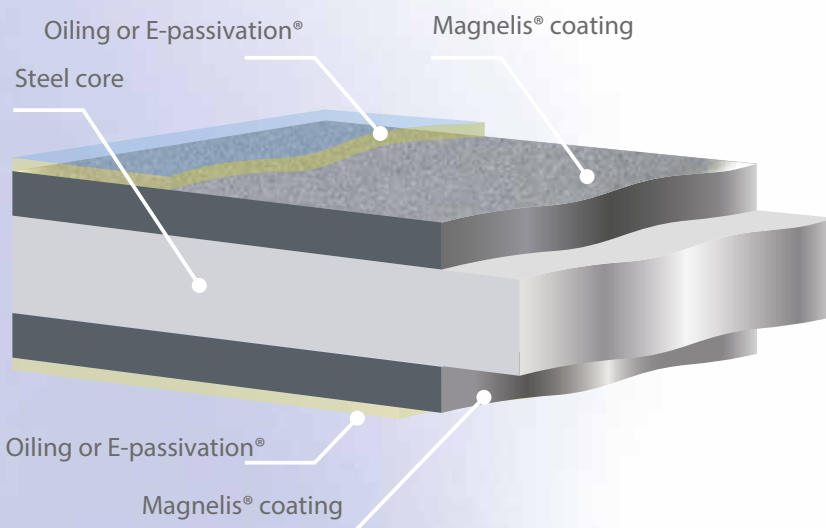




Magnelis® is a unique metallic coating that represents a breakthrough in corrosion protection. It is the best material with numerous applications.

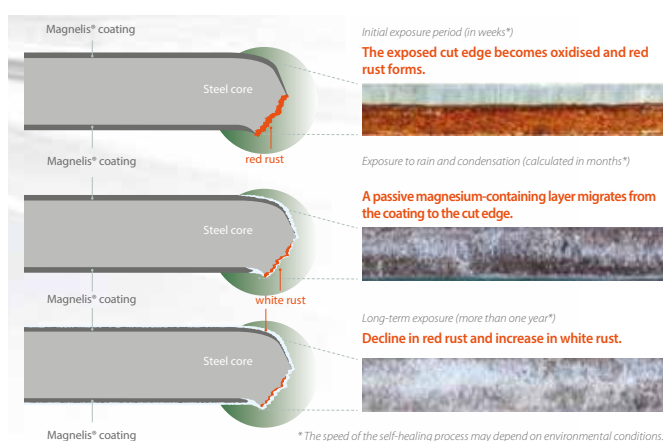
The unique chemical composition of the Magnelis® coating provides an unprecedented level of surface and cutting edge protection, even in extremely hostile environments.

Magnelis® coating is applied on a typical continuous hot-dip galvanized coating line, but the bath contains an admixture of 3.5% aluminium and 3% magnesium.



The Magnelis® coating is naturally dark grey in colour. The material is protected with environmentally friendly E-passivation® and oiled on request.

Edge protection through self-healing effect

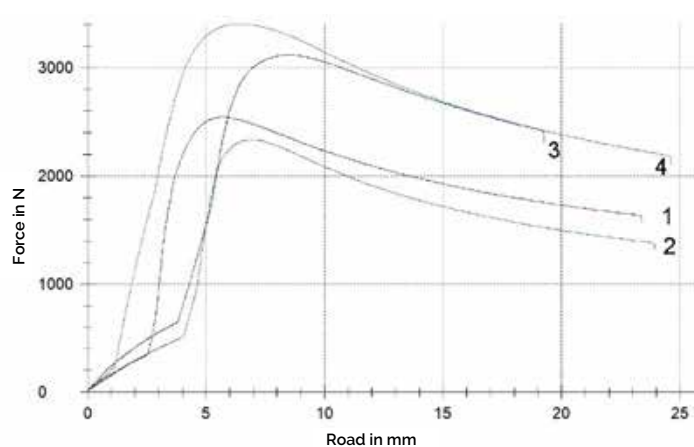


Exposed to the environment, the Magnelis® coating forms a zinc-based, high-density protective layer. This distinguishes it from similar layers formed on galvanised products, which are characterised by high porosity. This unique compact layer also forms on edges, welds, perforations and scratches. If red rust develops in these uncoated areas, it will gradually be covered with a protective Magnelis® layer. Penetration of this layer by external agents is almost impossible*

* all Magnelis® materials are taken from the official brochure **Magnelis® Think strategically**

** **Magnelis®** is a registered trademark owned by **ArcelorMittal Flat Carbon Europe S.A.**

Another test was to determine the mechanical properties of the fasteners for photovoltaic structures. The study determined the strength (load-carrying capacity) of two types of fixing elements (hooks).



Sample number	Hook type	Fmax kN	Fmax kg	Increase in strength %
1	without embossing	2.54	254	
2	without embossing	2.33	233	
medium:	without embossing	2.44	243.5	
3	with embossing	3.12	312	
4	with embossing	3.40	340	
medium:	with embossing	3.26	326	+33.9

Research summary:

Greater strength, and therefore load-carrying capacity, was provided by the fixing hooks, in which additional reinforcing ribs were made. Embossed hooks showed **up to 30 % greater strength**.



One of the first subjects of the work was a study of the resistance of coatings to salt spray: The coatings were subjected to a salt spray resistance test according to PN-EN ISO 9227:2017-06 Corrosion tests in artificial atmospheres - Tests in salt spray. Study duration of 720 h (30 days)



Photo 1. Photo before inserting the Magnelis® sample including the bolt in hot-dip galvanized coating into the salt chamber.



Photo 2. Photo before inserting sample of acid resistant steel 1.4301 with A2 stainless steel screw into the salt chamber.



Photo 3. Photo after 320 h magnelis including bolt in hot-dip galvanized coating.



Photo 4. Photo after 320 h sample of acid resistant steel 1.4301 with A2 stainless steel bolt



Photo 5. Photo after a full 720 h magnelis cycle including the bolt in hot-dip galvanized coating.



Photo 6. Photo after a full 720 h cycle sample of 1.4301 acid-resistant steel including A2 stainless steel screw.

The second part of the test was to expose the samples to moisture in a humidity chamber for 320 and 480 hours.



Photo 1
photo before insertion



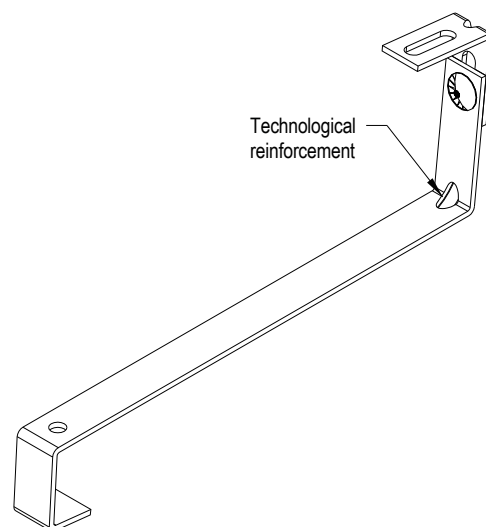
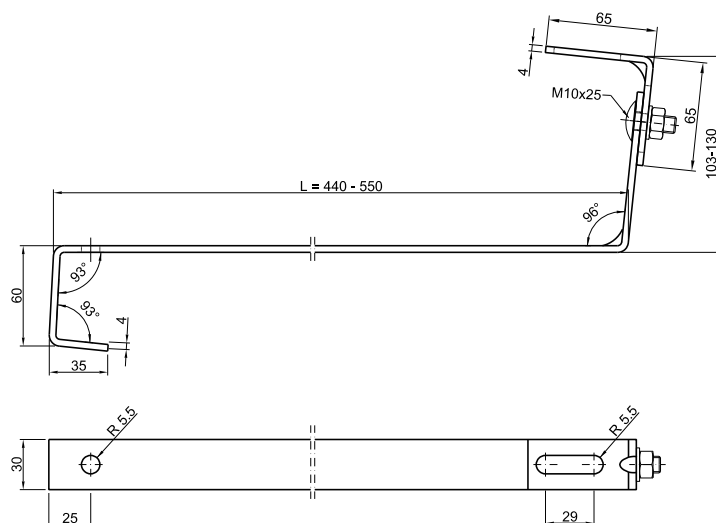
Photo 3
picture after 480 h

Research summary:

In practice, the use of an acidified salt spray environment is considered to be 100 to 1,000 times more aggressive than the coastal atmosphere. The corrosion rate of the galvanic coating is estimated at 0.5 microns per year in clean dry air, 5 microns per year in humid tropical atmospheres or even 5 to 20 microns per year in industrial atmospheres and coastal areas.

The above studies show that specimens made of Magnelis®-coated steel can withstand up to 20 years in a C4 environment without signs of corrosion. In addition, according to the manufacturer, the Magnelis coating has the ability to regenerate, which results in the healing of areas where the first signs of corrosion appear (cut edges, scratches, areas of deformation)

S-TYPE ROOF HOOK



The S-type roof hook with single adjustment is designed for the installation of photovoltaic panels on a roof covered with ceramic or concrete tiles with a thickness of max. 60 mm. It is used for downhole installation. The bracket allows to install mounting rails with dimensions of 40×40 mm, 40×45 mm, 38×45 mm. It is made from S450 GD high strength structural steel with Magnelis® ZM430 coating.

Producent / Manufacturer		Valueimpex Sp. z o.o. ul. Torowa 3B 42-280 Częstochowa	vi value impex
Kreślił / Designed	Nr identyfikacyjny / ID number		
P. Siewior	STL-PV-U01-M-T01		
Tytuł/Podtytuł / Title/Subtitle		Materiał / Material	
S-type roof hook with single adjustment		Sheet metal S450GD + ZM430 or HX450GD + ZM430	

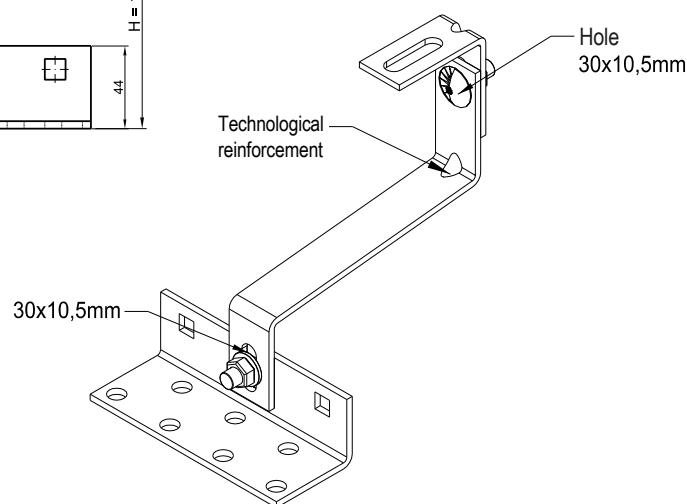
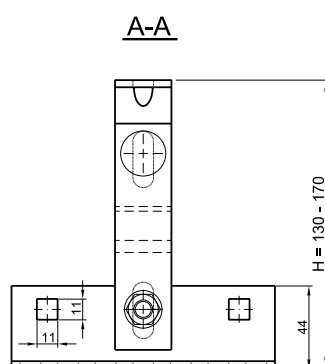
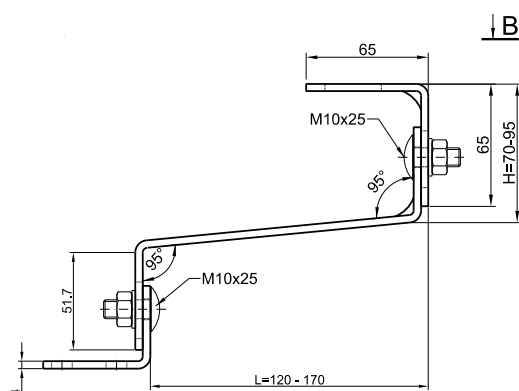
ADJUSTMENT RANGE:

H1: 103-130 mm

PRODUCTION RANGE:

L: 440-550 mm





The Vario double-adjustable roof hook is designed for the installation of photovoltaic panels on a roof covered with ceramic or concrete tiles with a thickness of max. 60 mm. It is used to fix the rafters to the roof framework. The bracket allows to install mounting rails with dimensions of 40x40 mm, 40x45 mm, 38x45 mm. It is made from S450 GD high strength structural steel with Magnelis ZM430 coating.

ADJUSTMENT RANGE:

H1: 70 - 95 mm

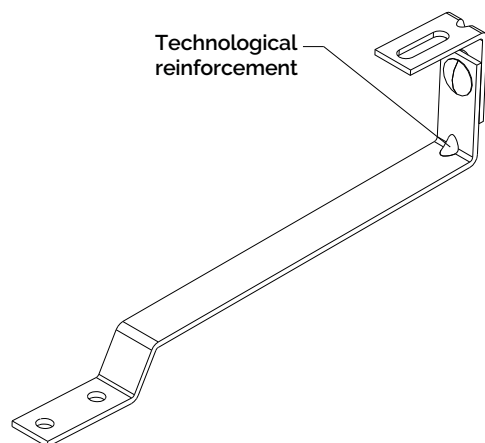
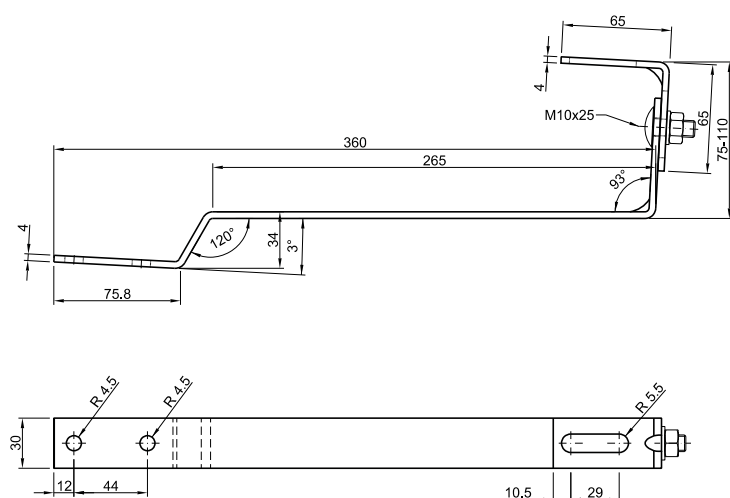
H2: 50 - 60 mm

PRODUCTION RANGE:

L: 120 - 170 mm

Producent / Manufacturer		Valueimpex Sp. z o.o. ul. Torowa 3B 42-280 Częstochowa	vi value impex
Kreślił / Designed	Nr identyfikacyjny / ID number		
P. Siewior	STL-PV-U04-M-T01		
Tytuł/Podtytuł / Title/Subtitle		Materiał / Material	
Vario roof hook with single adjustment 120		Sheet metal S450GD + ZM430 or HX450GD + ZM430	





The plain tile roof hook with single adjustment is designed for the installation of photovoltaic panels on a roof covered with plain tile. It is used to fix the rafters to the roof framework. The bracket allows to install mounting rails with dimensions of 40×40 mm, 40×45 mm, 38×45 mm. It is made from S450 GD high strength structural steel with Magnelis® ZM430 coating.

Producent / Manufacturer		Valueimpex Sp. z o.o. ul. Torowa 3B 42-280 Częstochowa	vi value impex
Kreślił / Designed	Nr identyfikacyjny / ID number		
P. Siewior	STL-PV-U02-M-T01		
Tytuł/Podtytuł / Title/Subtitle		Materiał / Material	
Roof hook with single adjustment for plain tiles		Sheet metal S450GD + ZM430 or HX450GD + ZM430	



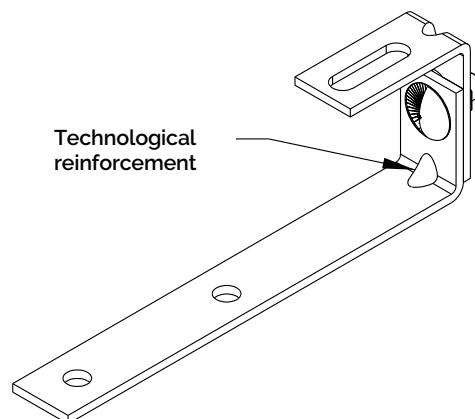
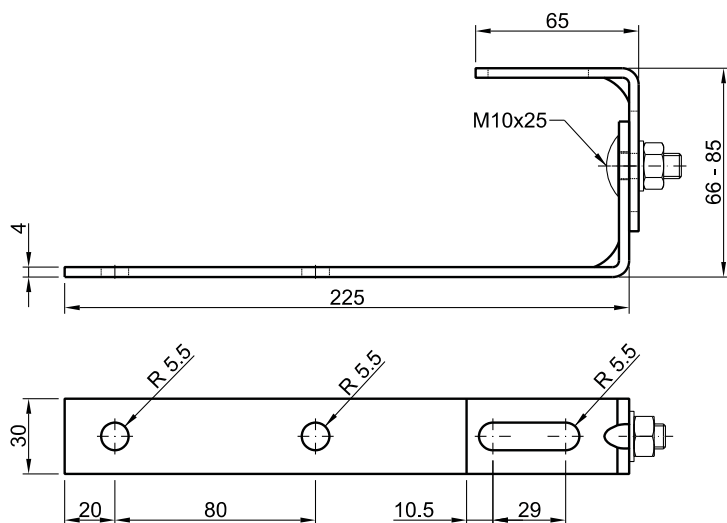
ADJUSTMENT RANGE:

H1: 75 - 110 mm

PRODUCTION RANGE:

L: 265 mm

STRAIGHT ROOF HOOK



The single-adjustable straight roof hook is designed for the installation of photovoltaic panels on roofs covered with felt or shingles. It is used to fix the rafters to the roof framework.

The bracket allows to install mounting rails with dimensions of 40x40 mm, 40x45 mm, 38x45 mm. It is made from S450 GD high strength structural steel with Magnelis® ZM430 coating.

ADJUSTMENT RANGE:

H1: 66 - 85 mm

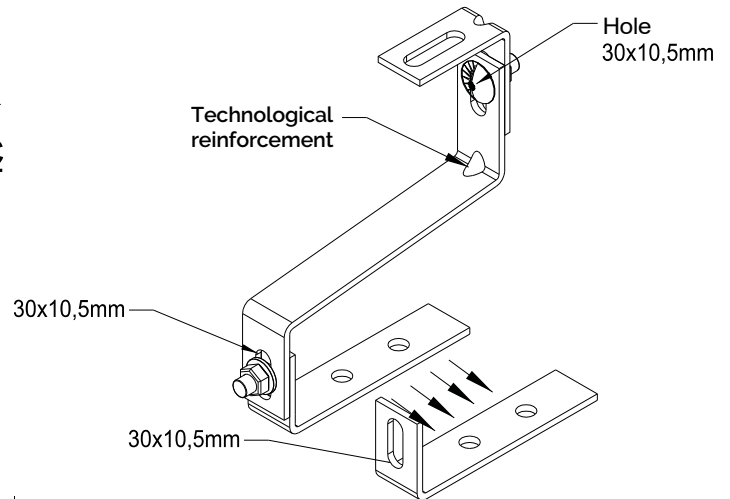
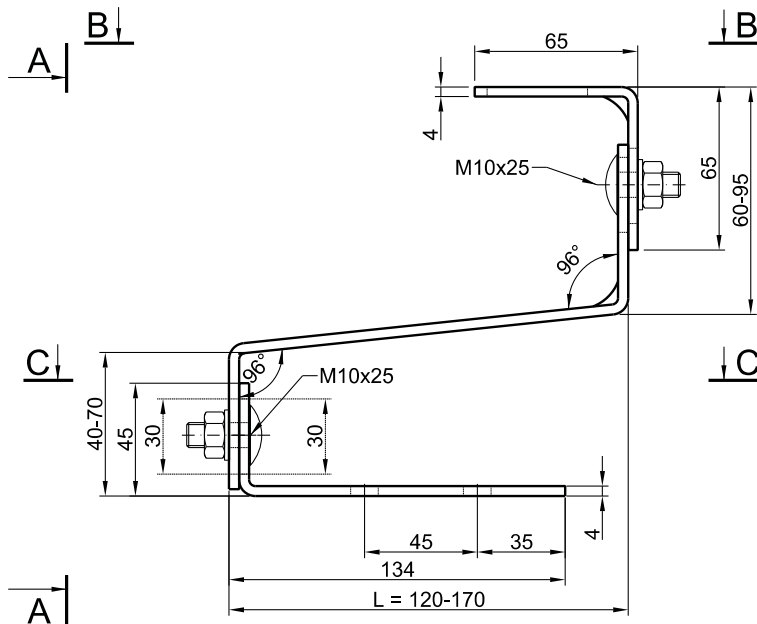
PRODUCTION RANGE:

L: 225 mm

Producent / Manufacturer		Valueimpex Sp. z o.o. ul. Torowa 3B 42-280 Częstochowa	vi value impex
Kreślił / Designed	Nr identyfikacyjny / ID number		
P. Siewior	STL-PV-U03-M-T01		
Tytuł/Podtytuł / Title/Subtitle		Materiał / Material	
Straight type roof hook with single adjustment		Sheet metal S450GD + ZM430 or HX450GD + ZM430	



J-type roof hook



The type J roof hook with double adjustment is designed for the installation of photovoltaic panels on a tiled roof. Used for fixing and top-up installation. The bracket allows mounting of rails with dimensions 40x40 mm, 40x45 mm, 38x45 mm. It is made from S450GD high strength structural steel with Magnelis® ZM 430 coating.

Producent / Manufacturer		Valueimpex Sp. z o.o. ul. Torowa 3B 42-280 Częstochowa	vi value impex
Kreślił / Designed	Nr identyfikacyjny / ID number		
P. Siewior	STL-PV-U05-M-T01		
Tytuł/Podtytuł / Title/Subtitle		Materiał / Material	
J-type roof hook with single adjustment		Sheet metal S450GD + ZM430 or HX450GD + ZM430	

ADJUSTMENT RANGE:

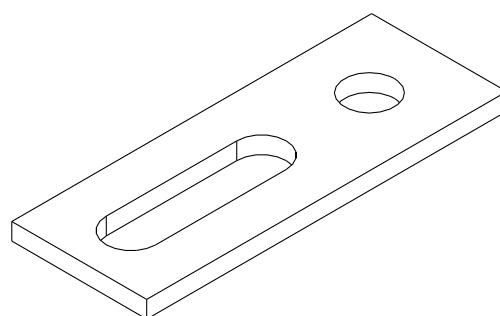
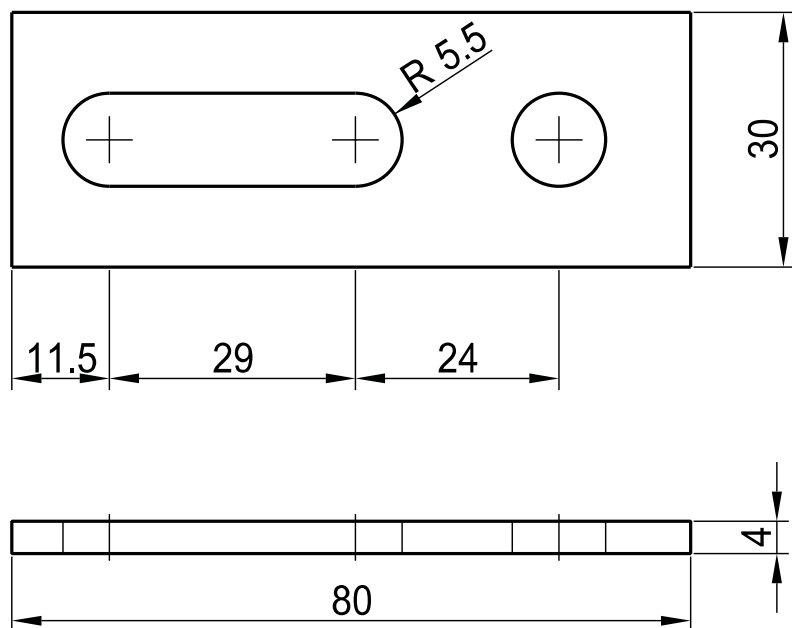
H1: 40-70 mm

H2: 60-95 mm

PRODUCTION RANGE:

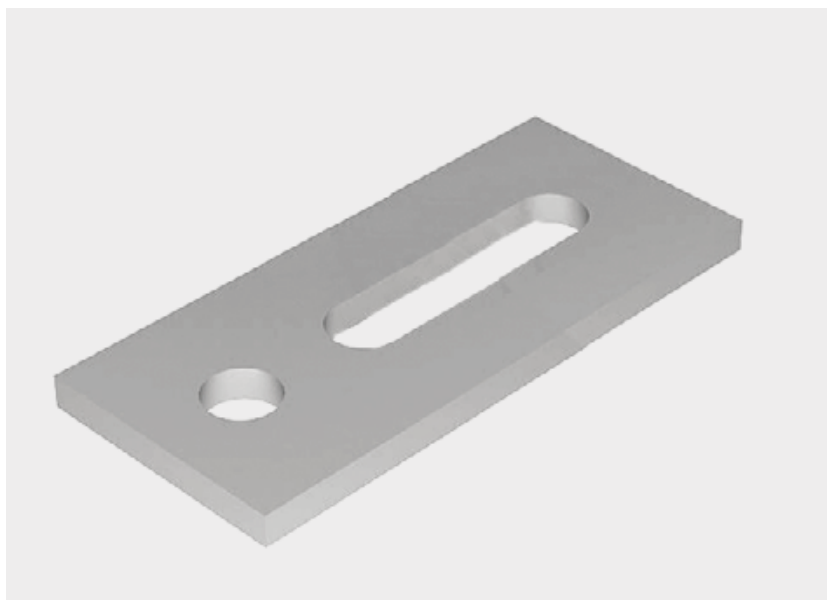
L: 120-170 mm





The mounting adapter is used for the installation of photovoltaic structures on roofs covered with sheet metal, tile or shingle. An M10 diameter hole is used to connect the adaptor to a double-threaded bolt screwed into the roof structure. It is made from S450 GD high strength structural steel with Magnelis® ZM430 coating.

Producent / Manufacturer		Valueimpex Sp. z o.o. ul. Torowa 3B 42-280 Częstochowa	vi value impex
Kreślił / Designed	Nr identyfikacyjny / Numer ID		
P. Siewior	STL-PV-M06-M-T01		
Tytuł/Podtytuł / Title/Subtitle		Materiał / Material	
Mounting adapter Typ Mo7		Sheet metal S450GD + ZM430 or HX450GD + ZM430	



PRODUCTION RANGE:

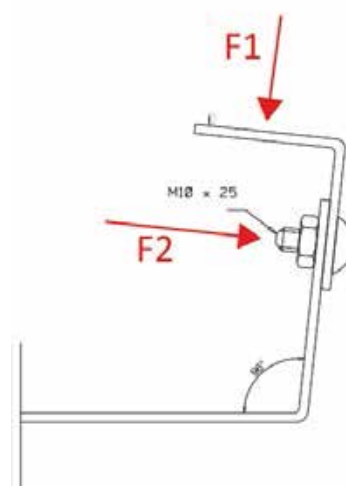
Dimensions: 30 x 80 mm

The technical parameters of the manufactured assembly anchors were determined by numerical simulations and then confirmed by laboratory tests commissioned by Valueimpex Sp. z o.o. at the Faculty of Production Engineering and Materials Technology, Częstochowa University of Technology.

Characteristics / parameters	Performance characteristics	Reference
Load type	Static, quasi-static	NPD
Application	For outdoor use in environments C1, C2, C3	NPD
Handle material	S450GD or HX460GD	PN-EN 10346:2015-09
Protective coating	ZM430	PN-EN 10346:2015-09
Connecting elements	M10 screws, class: 8.8	DIN 603
Screw tightening torque during assembly	M10 - 45Nm	NPD
Bending resistance F1*	2.31 kN	Commissioned research to CZĘSTOCHOWA UNIVERSITY OF TECHNOLOGY, Faculty of Production Engineering and Materials Technology
Bending resistance F2**	2.2 kN	Commissioned research to CZĘSTOCHOWA UNIVERSITY OF TECHNOLOGY, Faculty of Production Engineering and Materials Technology
Recommended anchor spacing	800 - 1200mm	Commissioned research to CZĘSTOCHOWA UNIVERSITY OF TECHNOLOGY, Faculty of Production Engineering and Materials Technology
Temperature range	-40°C to +80°C	NPD

*) F1 - This is the maximum permissible bending force acting on the anchor at its connection to the aluminium profile. This force was determined at the maximum possible anchor height. If the anchor height is lower, the value of the F1 force will increase proportionally.

**) F2 - This is the maximum allowable force that can bend the anchor at the point of reinforcement. Once this value is exceeded, the hook will deform.





according to PN-EN 1991-1-3

according to PN-EN 1991-1-4

according to PN-81/B-03020



When installing a hook-based construction in EU countries, we recommend using snow and wind load maps that refer to the documents standardising coefficients in the country in question.

<https://www.dlupal.com/en/solutions/online-services/snow-load-wind-speed-and-seismic-load-maps>

Selection of the number of hooks in relation to the loads associated with the snow standard EN 1991-1-3

Load in the snow zone	1 - 0.7 kN/m ²	2 - 0.9 kN/m ²	3 - 1.2 kN/m ²	4 - 1.6 kN/m ²	5 - 2.0 kN/m ²
kN/m ² - kg/m ²	71.38	91.774	122.36	163.155	203.943

Selection of the number of hooks in relation to the loads associated with the wind standard EN 1991-1-4

Load in the snow zone	1 - 0.3 kN/m ²	2 - 0.42 kN/m ²	3 - 0.62 kN/m ²	
kN/m ² - kg/m ²	30.591	42.828	63.222	

Table of Combined Loads Snow Zone + Wind Zone kg/m²

Wind \ Snow	1	2	3	4	5
1	101.97	122.37	152.95	193.75	-
2	-	134.60	165.19	-	-
3	134.60	-	185.58	-	267.17

Example 1. Calculation of load per m²

$m^2 * \text{snow load} + \text{wind load per zone}$

$$20 m^2 * I \text{ wind zone} + I \text{ snow zone} = 20 m^2 * (71.38 \text{ kg/m}^2 + 30.591 \text{ kg/m}^2) = 2,039.4 \text{ kg}$$

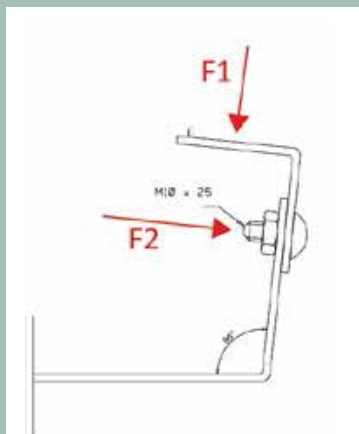
$$20 m^2 * III \text{ wind zone} + III \text{ snow zone} = 20 m^2 * (122.36 \text{ kg/m}^2 + 63.22 \text{ kg/m}^2) = 3,711.6 \text{ kg}$$

As an example, a fixed load was calculated for a photovoltaic installation located in snow zone I and wind zone I and snow zone III and wind zone III.

LOAD CAPACITY OF HOOKS FOR MOUNTING PHOTOVOLTAIC INSTALLATIONS

F1 - Maximum permissible bending force acting on the anchor at its connection to the aluminium profile.

According to the Technical and Operating Documentation, the bending resistance is 2.2 kN. $2.2 \text{ kN} = 220 \text{ kg/m}^2$



Recommended spacing of mounting hooks every **900 mm according to the hooks' technical documentation**, therefore, for individual cases we need the following:

Vertical arrangement of modules (2 rows of 5 modules) I and III snow zone:

For the purposes of the calculation, the following module dimension was assumed: 2000 x 1000

$$27.76 / 0.9m = 31 \text{ hooks}$$

Horizontal arrangement of modules (2 rows of 5 modules) I and III snow zone:

$$47.76 / 0.9m = 54 \text{ hooks}$$

***not recommended Minimum number of hooks for installation of photovoltaic systems in a given snow zone**

Minimum number of hooks required for mounting photovoltaic modules
surface area of the modules* snow and wind load in the respective snow zone

hook load capacity from the operation and maintenance documentation

Example 1. Minimum necessary number of hooks for installation of photovoltaic system for snow zone I and wind zone I with an area of 20 m²

$$\text{minimum number of hooks required} = \frac{2039,4}{220} = 10$$

Example 2. Minimum number of hooks required for installation of photovoltaic system for snow zone III and wind zone II of 20 m²

$$\text{minimum number of hooks required} = \frac{3\,303,8}{220} = 16$$

Example 3. Minimum number of hooks required for installation of photovoltaic system for snow zone V and wind zone II of 20 m²

$$\text{minimum number of hooks required} = \frac{5343,4}{220} = 25$$

DECLARATION OF PERFORMANCE DWU/SX/01/2022		
The Principal:	-	
Project:	Construction kit: Roof hooks for photovoltaic mounting U01, U02, U03, U04, U04- T02,	
SX Project No:	01/2022	
Intended use:	Construction and civil engineering works for exterior and interior use according to EN 1090	
	Valueimpex Sp. z o.o. ul. Torowa 3b, 42-280 Częstochowa, Polska	
System of assessment and verification of constancy of performance		2+
TÜV Rheinland Polska Sp. z o.o. ul. Wolności 347, 41-800 Zabrze, Poland Notified Body No. 2627		
The manufacturer confirms by means of the Factory Production Control Certificate No.: NR 2627-CPR-1090-1.PL0464.TÜVRh.22.00 the following performance characteristics in relation to the component specifications:		
Essential characteristics	Properties	Harmonised technical specification
Dimensional and shape tolerances:	According to EN 1090-2	EN 1090-1:2009 + A1:2011
Weldability:	S235JR according to EN 10025-2	EN 1090-1:2009 + A1:2011
Fracture toughness:	Min 27 J (+200C)	EN 1090-1:2009 + A1:2011
Reaction to fire:	Class A1	EN 1090-1:2009 + A1:2011
Cadmium release:	NPD	EN 1090-1:2009 + A1:2011
Radioactivity:	NPD	EN 1090-1:2009 + A1:2011
Persistence:	15 years. Corrosivity category: C5 (Magnelis® coated steel and for stainless steel); C3 aluminium unpainted.	EN 1090-1:2009 + A1:2011
Carrying capacity:	NPD	EN 1090-1:2009 + A1:2011
Fatigue strength:	NPD	EN 1090-1:2009 + A1:2011
Fire resistance:	NPD	EN 1090-1:2009 + A1:2011
Construction class:	According to EN 1090-2, EXC 1, EXC 2	EN 1090-1:2009 + A1:2011
The declared properties of the steel construction product correspond to those declared in the table above which is the subject of the delivery. Only the manufacturer is responsible for issuing this declaration of performance. On behalf of the manufacturer the declaration has been signed by:		

Częstochowa, 10.03.2023.

VALUEIMPEX Sp. z o.o.
ul. Torowa 3 B
42-280 Częstochowa
NIP 525 273 39 34 REGON 369047665
KRS 0000710838 www.valueimpex.pl

PREZES ZARZADU
Rafał Holik



CERTYFIKAT ZGODNOŚCI ZAKŁADOWEJ KONTROLI PRODUKCJI (ZKP) 2827-CPR-PW01-1-1168-0183.22.00

Zgodnie z Rozporządzeniem Parlamentu Europejskiego i Rady nr 2009/18 z dnia 9 marca 2011 r.
[Rozporządzenie CPR] niniejszy certyfikat odnosi się do wyrobów budowlanych

Wyrób budowlany	STALOWE I ALUMINIOWE ELEMENTY KONSTRUKCYJNE SKŁADANE w klasie wykonania do EXC 1
Metoda dokonywania zgodności	Zgodnie z EN 1090-1:2009+A1:2011, załącznik ZA Charakterystyka techniczna na podstawie porównawczego testu produkcyjnego względem docisku 1°C
Producent	wprowadzonego do obrotu pod nazwą lub znakiem firmowym producenta VALUEIMPEX sp. z o.o. ul. Torowa 3B, 42-280 Częstochowa, Polska produkowanego w zakładach produkcyjnych VALUEIMPEX sp. z o.o. ul. Główna 279, 43-190 Mikołów, Polska
Potwierdzenie	Niniejszy certyfikat potwierdza, że wszystkie postanowienia dotyczące oceny i weryfikacji są zgodne z wymaganiami określonymi w załączniku ZA normy. EN 1090-1:2009+A1:2011 W ramach systemu 2+ są stosowane oraz że zakładowa kontrola produkcji spełnia mające zastosowanie wymagania
Odniesienie	Niniejszy certyfikat został wydany po raz pierwszy w dniu 01.09.2012, zgodnie z art. 21 rozporządzenia nr 2009/18, weryfikacji są zgodne z wymaganiami określonymi w załączniku ZA normy. Wskazuje się, że weryfikacja nie jest wymagana, ponieważ nie ma wątpliwości co do zgodności z wymaganiami normy, która jest przedmiotem niniejszego certyfikatu
Miejsce i data wydania	Katowice, 01.09.2012
Data kolejnej weryfikacji	do 24.09.2012, pod rygorem utraty ważności certyfikatu

TÜV THÜRINGEN POLSKA Sp. z o.o.
ul. Żelazna 38, 40-050 Katowice
JEDNOSTKA NOTYFIKOWANA nr 2837



WYKONANIE
Certyfikat
LUBO 2012



D. Bartek
Dariusz Bartek
Dyrektor Centrum Certyfikacji



SPAWALNICZE ŚWIADECTWO KWALIFIKACYJNE TTP-PW01-1-1168-0183.20.00

zgodnie z EN 1090-1:2009+A1:2011 Infol B 1

wydane dla

Producent:	VALUEIMPEX sp. z o.o. ul. Torowa 3B, 42-280 Częstochowa, Polska
Zakład produkcyjny:	VALUEIMPEX sp. z o.o. ul. Główna 279, 43-190 Mikołów, Polska
Specyfikacja techniczna oraz klasy wykonania:	Wytwarzanie elementów konstrukcyjnych i zestawów konstrukcyjnych w klasach wykonania do EXC 1 wg wymagań ul. EN 1090-2:2018 Wytwarzanie elementów konstrukcyjnych i zestawów konstrukcyjnych w klasach wykonania do EXC 1 wg wymagań ul. EN 1090-3:2018
Procesy spawalnicze:	Zgodnie z EN ISO 4063: nie dotyczy
Materiały podstawowe:	Zgodnie z EN 1090-1:2009+A1:2011: nie dotyczy
Nadzór spawalniczy sprawujący:	nie dotyczy
Załączniki:	—
Uzasadnienie do spawania:	W zakresie wytwarzania wyrobów wymienionych powyżej Producent wdrożył i stosuje wymagania normy: nie dotyczy
Inne stosowane procesy zgodnie z powyższą specyfikacją:	Wytwarzanie osładek wytrzymałościowych, opasek mechanicznych, kurczących się na zimno, wykonanych z użyciem technologii: nie dotyczy
Początek ważności Świadectwa:	Katowice, 01.09.2012
Odniesienie:	Niniejsze świadectwo posiada ważne pod warunkiem, że nie wystąpi żadna zmiana opisana w EN 1090-1:2009+A1:2011 pkt. 3.4.1 oraz że certyfikat Zakładowej Kontroli Produkcji obejmujący powyższy zakres nie zostanie zawieszony lub cofnięty przez jednostkę notyfikowaną
Uwagi:	Przebieg historii obrotu konstrukcyjnego w oparciu o: FURKOP-FH:1990, FN 1991-1-3, FN 1991-1-4, EN 1991-1-5, EN 1993-1-1, EN 1990-1-3, EN 1993-1-4, EN 1993-1-8, EN 1999-1-1, wraz z odpowiednimi załącznikami



D. Bartek
Dariusz Bartek
Dyrektor Centrum Certyfikacji



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