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K2 Systems

17 October 2023

2:00 pm – 3:00 pm | BST, London

3:00 pm – 4:00 pm | CEST, Berlin

4:00 pm – 5:00 pm | EEST, Athens



Tristan Rayner

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K2 Systems

pv magazine
webinars

New Mounting Systems for Solar Facades

Welcome!

Do you have any questions? ? 

Send them in via the Q&A tab.  We aim to answer as many as we can today!

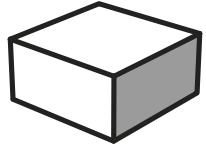
You can also let us know of any tech problems there.

We are recording this webinar today. 

We'll let you know by email where to find it and the slide deck, so you can re-watch it at your convenience.  



Connecting Strength



K2 WallPV

Scalable PV mounting systems for facades
in industrial and commercial buildings





Connecting Strength

Content



- **Demo** of systems
- **Advantages** of K2 WallPV
- **Why** PV systems on facades?
- **Facade requirements** compared to roof systems
- **Safety concept:** Approvals and anti-slip protection
- **Fire protection** options



Connecting Strength

Introduction K2 Systems

Since 2004 **rooftop specialists**

10 

Locations

5 

Continents

120 

Sales partners
worldwide

420 

Employees



> 130

Countries with K2
Systems installations



> 29 GW

Installed K2 systems have
a worldwide total capacity



> 200 MW

Weekly product shipments



393.544

Projects worldwide



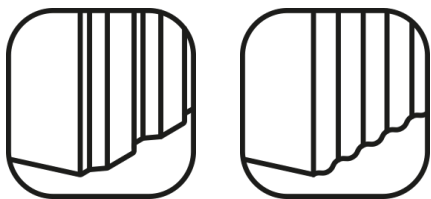
Connecting Strength

Demo of systems

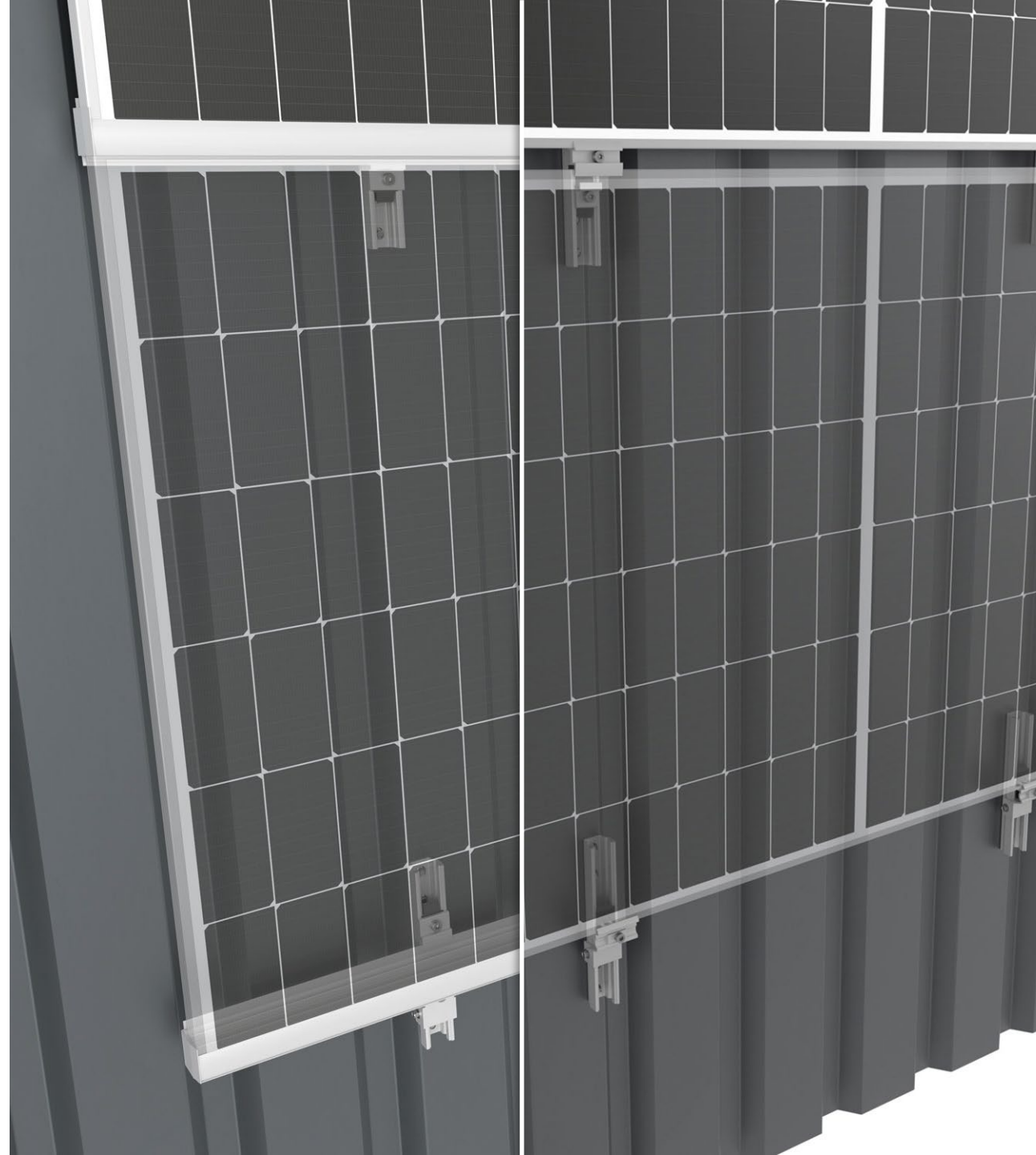


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K2 WallPV MultiRail



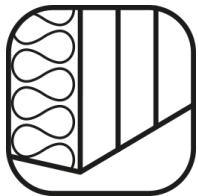
- Facade fastening with MultiRail: **building authority-approved thin sheet metal screws**
- Trapezoidal or corrugated: **For almost all common sheet metal profiles**
- **Insertion rails or module clamps:**
Large hall facades or small commercial and agricultural buildings



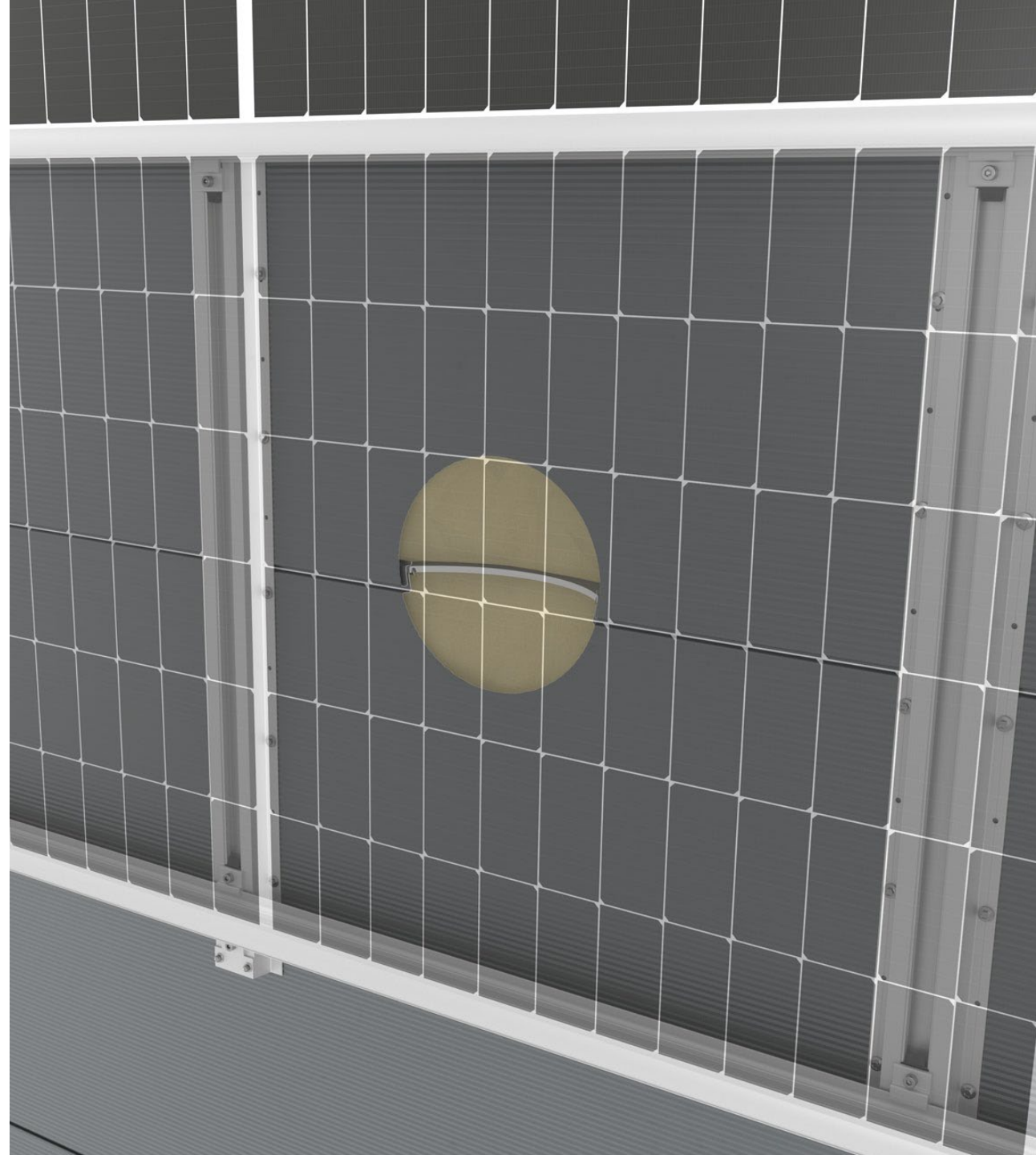


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K2 WallPV CarrierRail



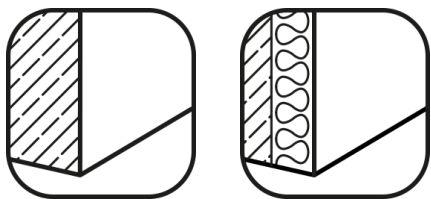
- **Cooperation with Fischer Profil:**
important sandwich profile
manufacturer
- **Building approval** (abZ) for Germany
- **Does not damage the insulation** and
uses certified screws like MultiRail



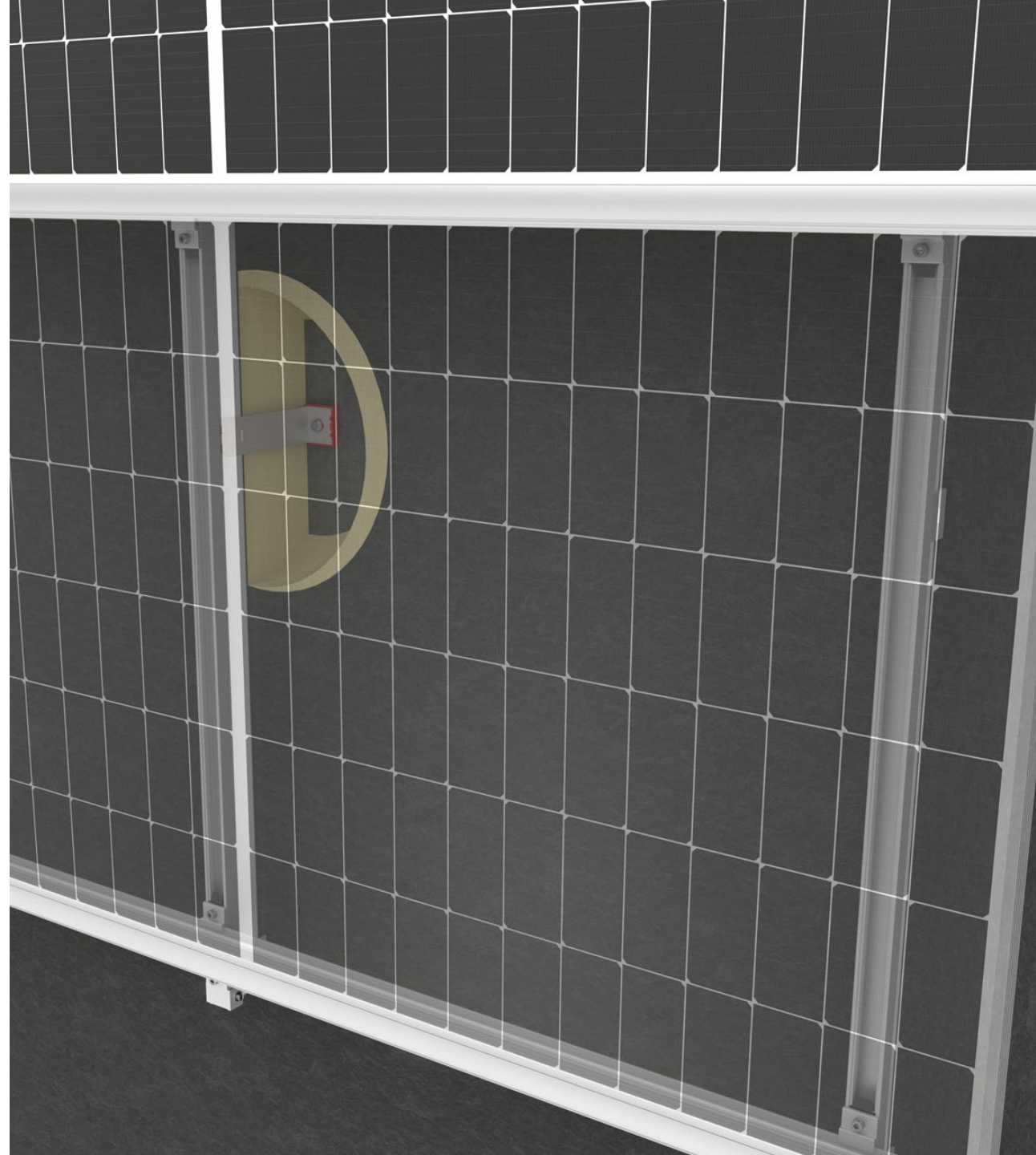


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K2 WallPV FacadeRail



- **Flexible console installations** on any hard mineral walls
- **Many building approved consoles** are compatible to FacadeRail
- Combination with **ETICS facades**





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Advantages of K2 WallPV

- **All common framed PV modules:**
FacadeClamp 30-40 mm; InsertionRail 30/35/40 mm
- **Scalable modular system:**
Many existing roof components
- **Well-known assembly methods** as in rooftop assembly
- **Existing and new buildings:**
Trapezoidal & corrugated sheet, concrete, masonry and sandwich facades





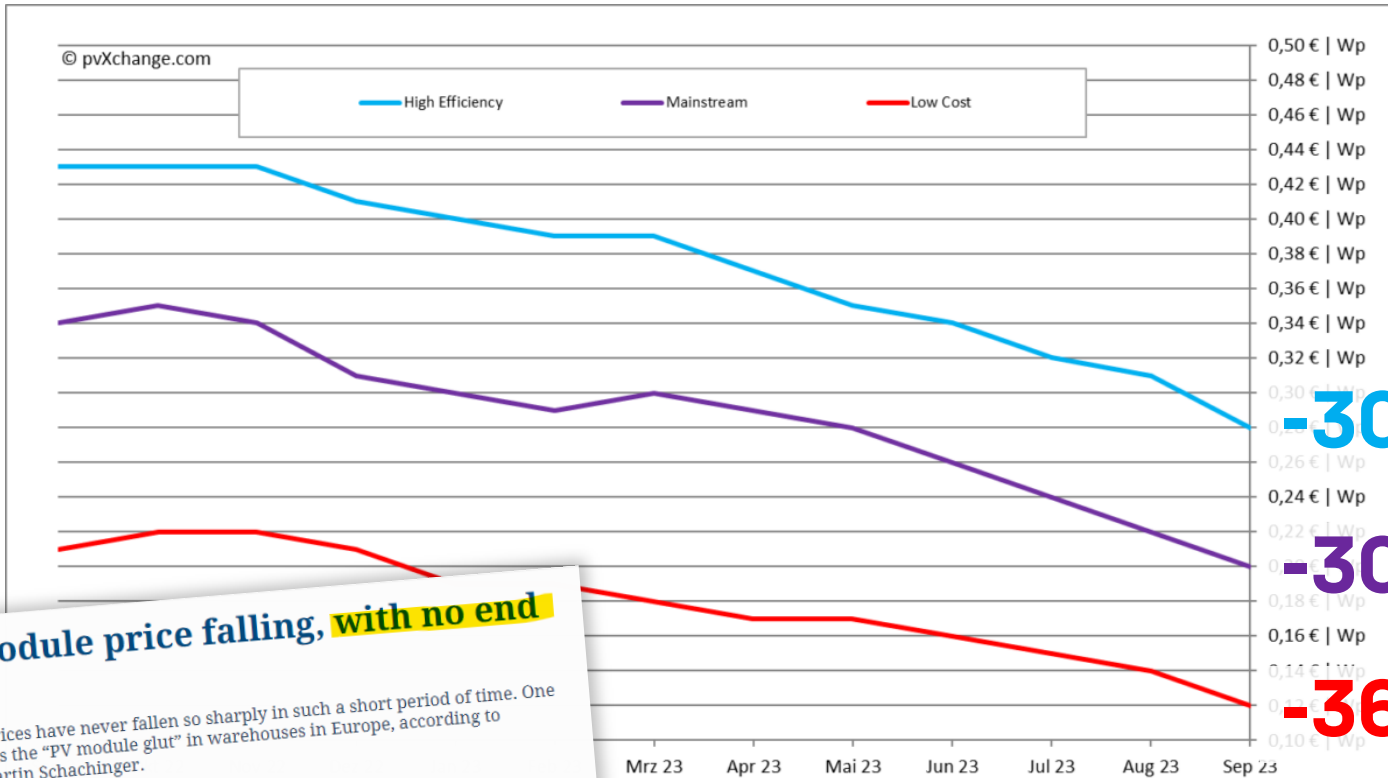
Why facades?

- Focus on **industrial and commercial buildings**: best market volume and opportunities
- **Often bigger areas** than on rooftop
- **Large and immediate usage** without storage
- PV power **without additional land consumption**
- **Winter power effect**: no snow covering and optimal low-lying solar radiation
- Constantly **cheaper module costs**: financial efficiency
- Increasing amount of **customer requests**
- **No competition** with roof-mounted and ground-mounted PV systems



Why facades?

Module prices and PV expansion



-30%

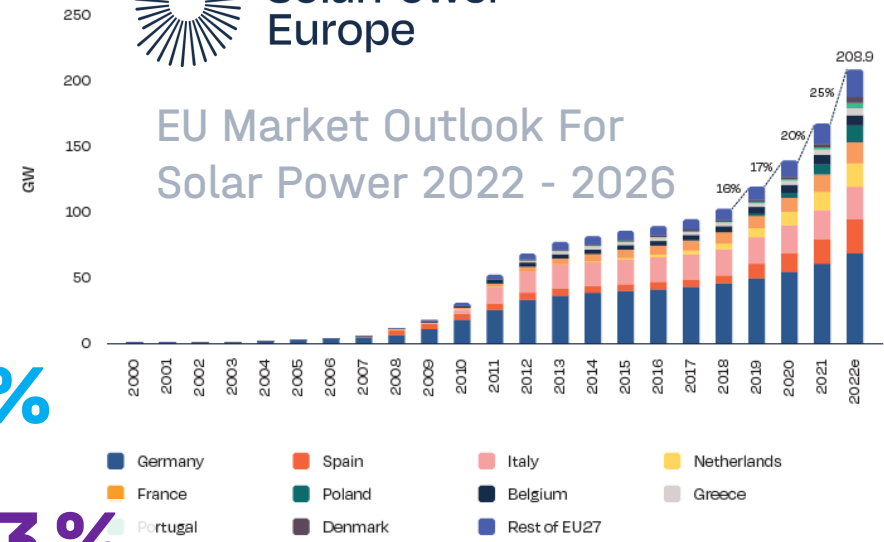
-30,3%

-36,8%



SolarPower Europe

EU Market Outlook For Solar Power 2022 - 2026



Solar module price falling, with no end in sight

Solar module prices have never fallen so sharply in such a short period of time. One reason for this is the "PV module glut" in warehouses in Europe, according to pvXchange's Martin Schachinger.

SEPTEMBER 25, 2023 | MARTIN SCHACHINGER, PVXCHANGE.COM

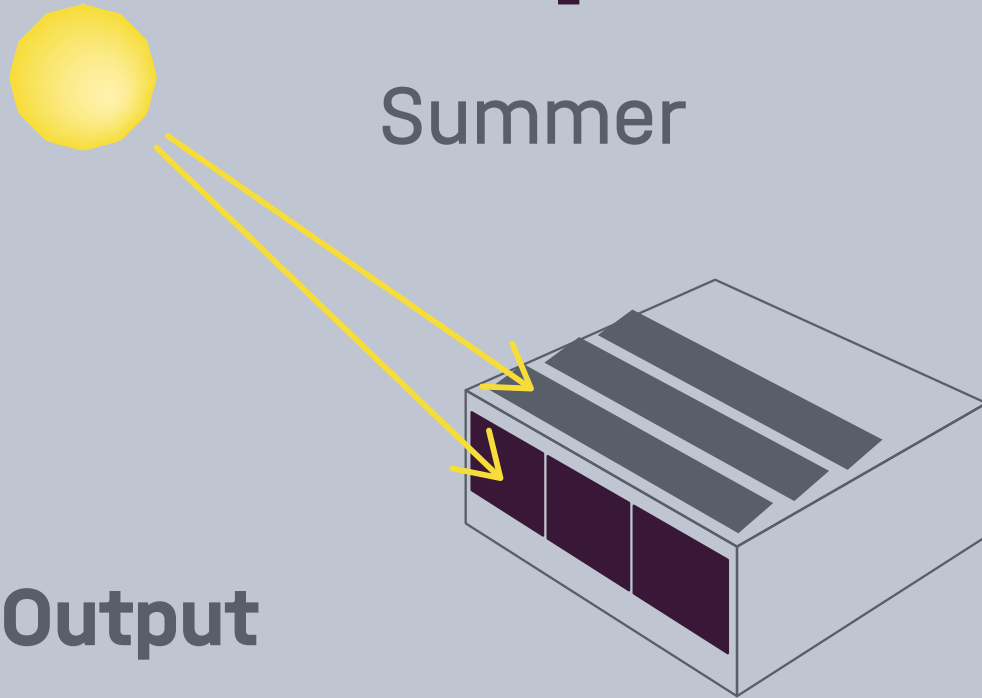
MARKETS | MODULES & UPSTREAM MANUFACTURING | OPINION & ANALYSIS | WORLD

<https://www.pv-magazine.com/2023/09/25/solar-module-price-falling-with-no-end-in-sight/>

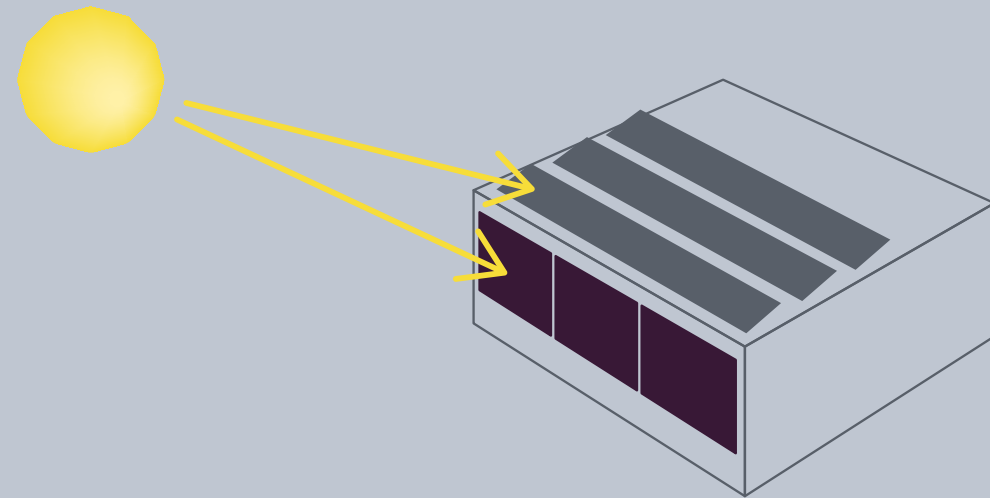


Why facades?

Winter power effect



Summer



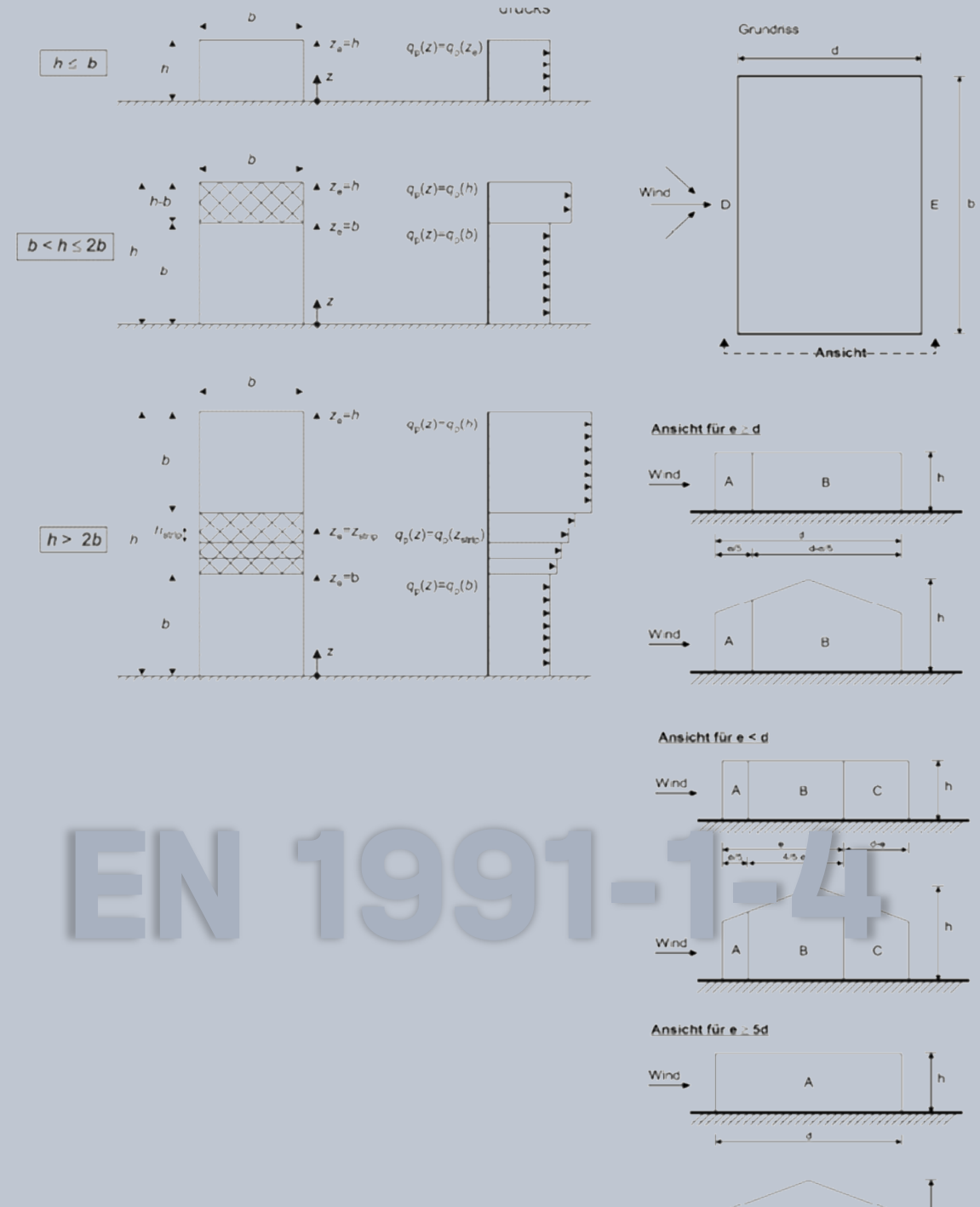
Winter

Output



Facade requirements

- **EN 1991-1-4** is used globally for calculation
- **K2 calculation outperforms** the standard in terms of zone demands

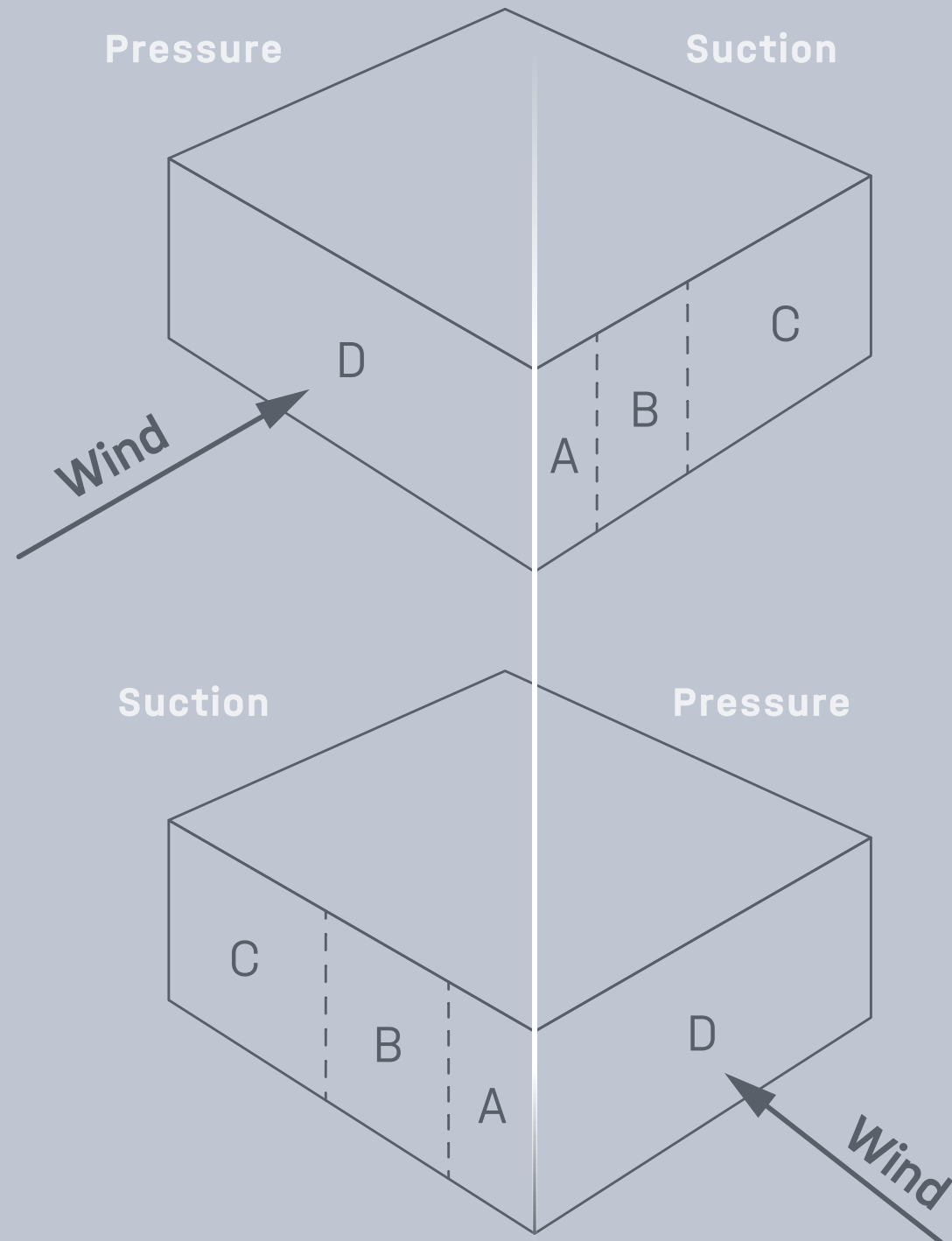


EN 1991-1-4



Facade requirements

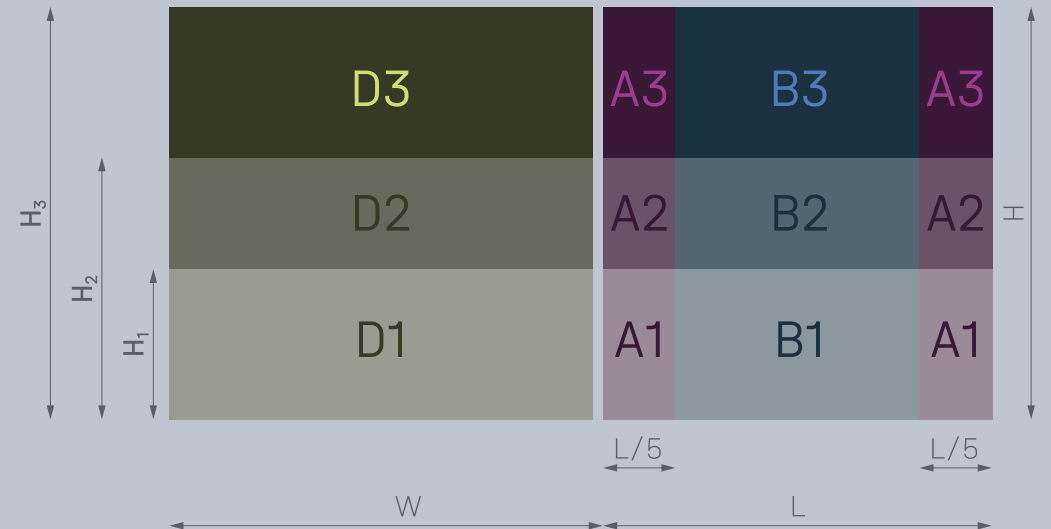
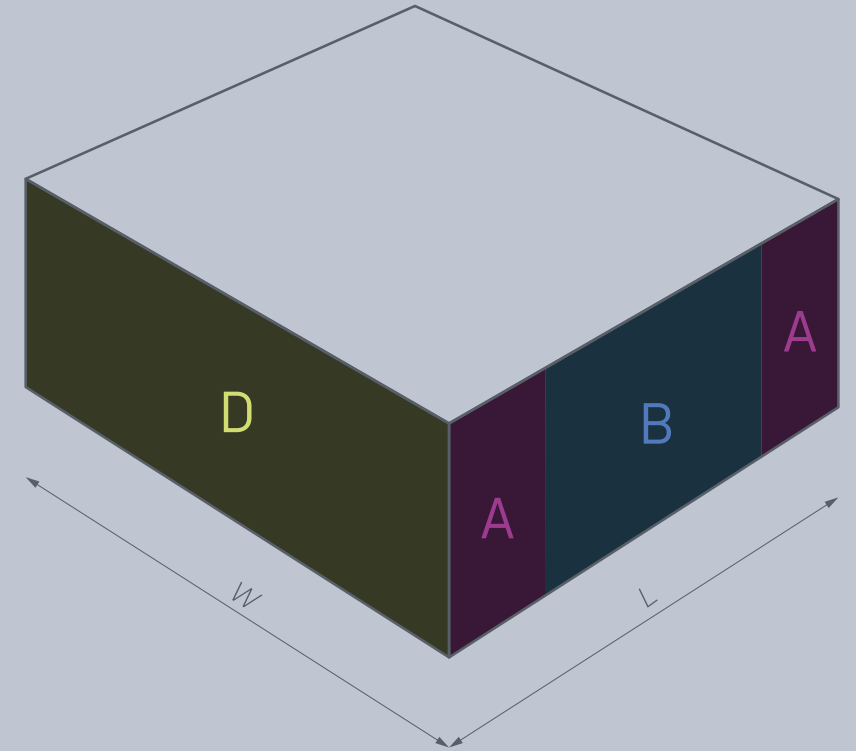
- **Also graded** in zones like roofs
- **Zones depending on wind pressure or suction:** both cases must be calculated
- **Zone C** only exceptional cases
→ for lengths or widths $\geq 4 \times$ height or $2 \times$ width (smaller value decisive)





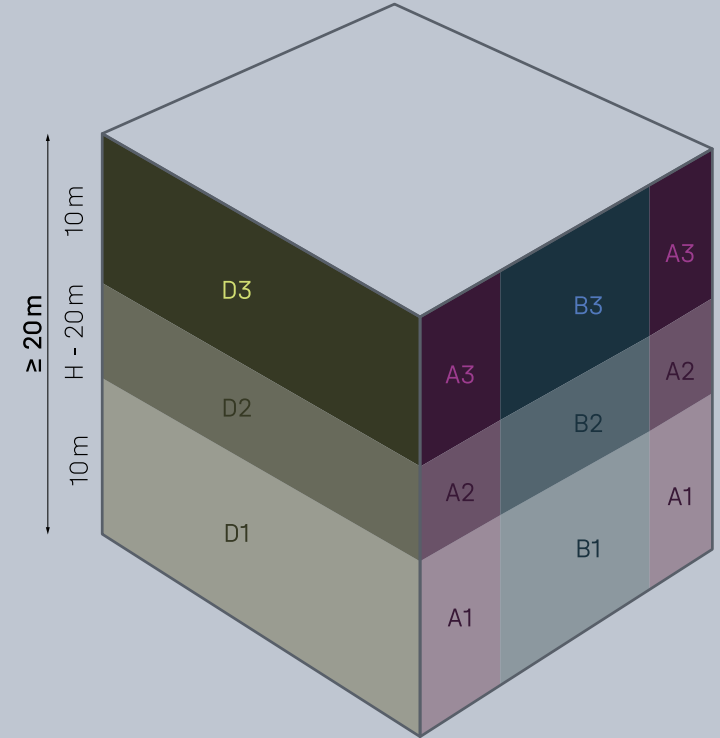
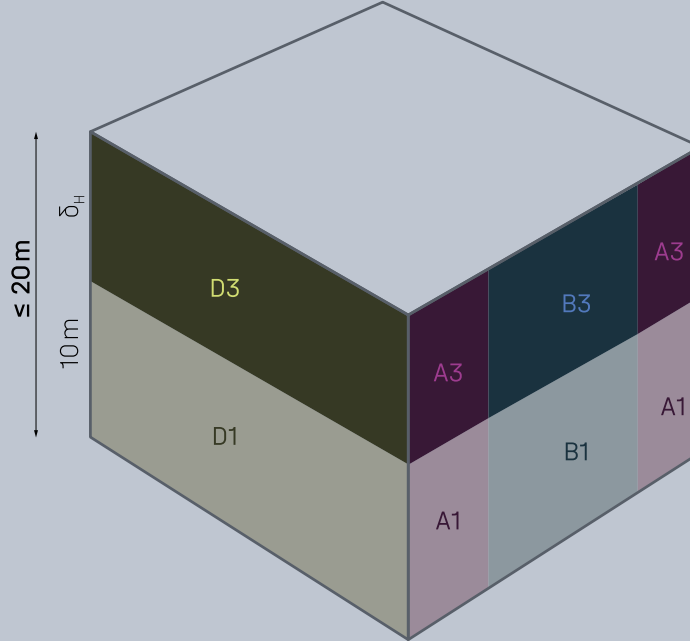
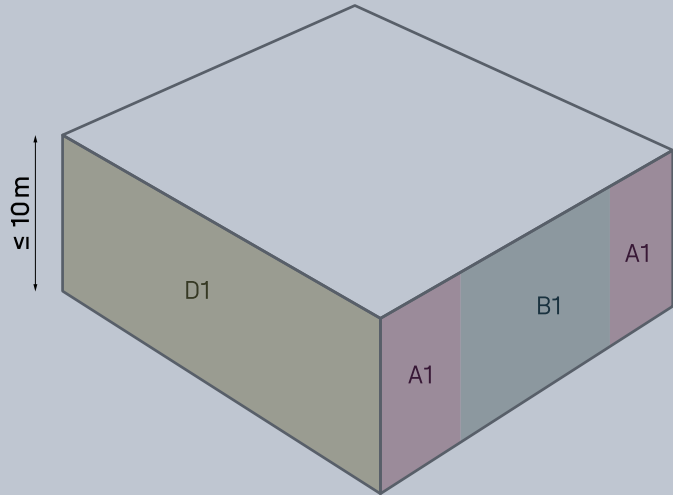
Facade requirements

- **Zone C is ignored** by the K2 calculation
- Zone C is calculated as zone A which makes is a **higher level than the standard**
- **Worst case scenario** for wind exposition or no inspection necessary



Facade requirements

Wind loads ↑



- $L \times W = 10 \times 10 \text{ m}$
- **Zone C**
 - Appears in the standard for $L > 2 \times W$ or $L > 2 \times H$ (small value decisive)
 - Only 1m wide for a length of 21m

$$H_1 = L$$

$$H_2 = H - H_1 \text{ if } H > 2 \times H_1$$

$$H_3 = H \text{ if } H > H_1$$



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Safety concept: Approvals and anti-slip protection

- **All screw connections certified** which connect to the facade
- All system connections use **high tightening torques**
- High diameters for screws ensure **strong retention force**
- **Anti-slip protection** in the bottom row of modules





Connecting Strength

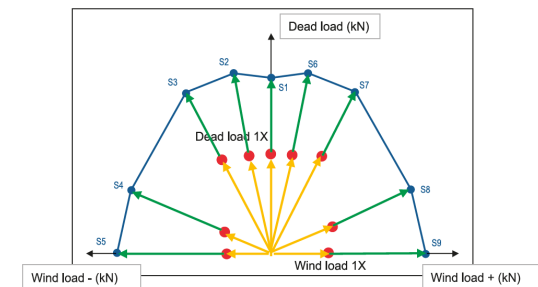
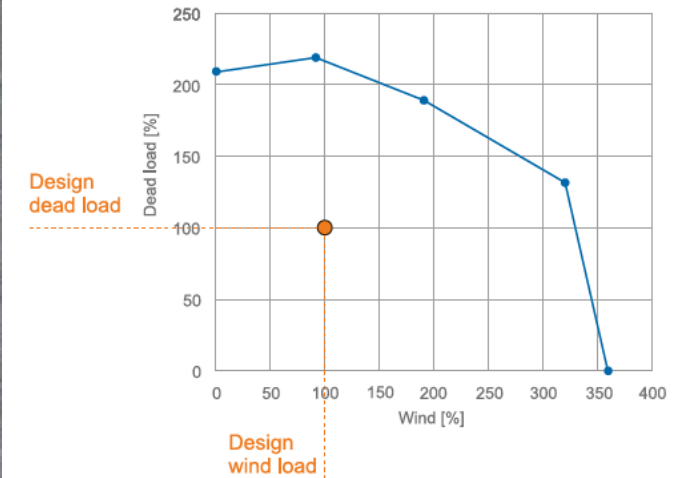
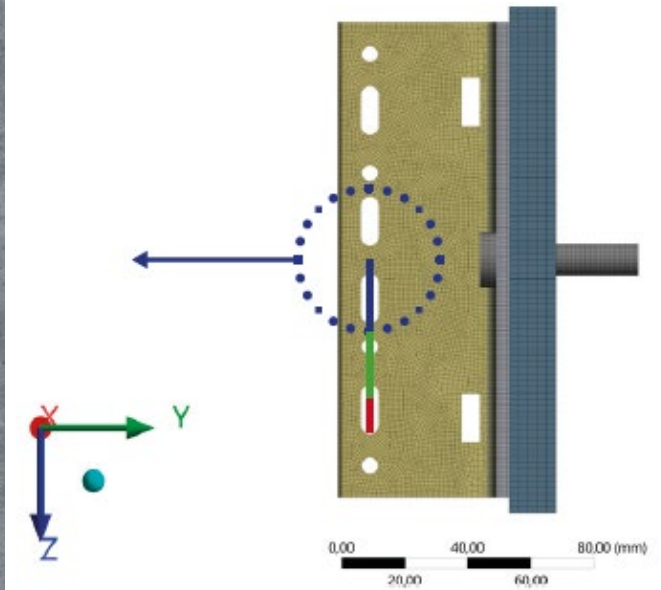
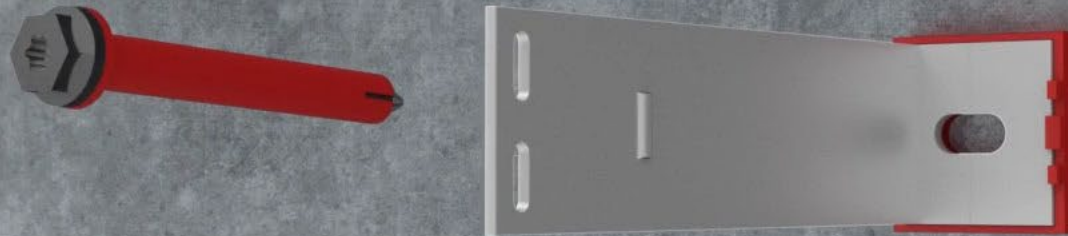
**FacadeClamp
can carry the
whole system
but additonal
safety item**





Connecting Strength

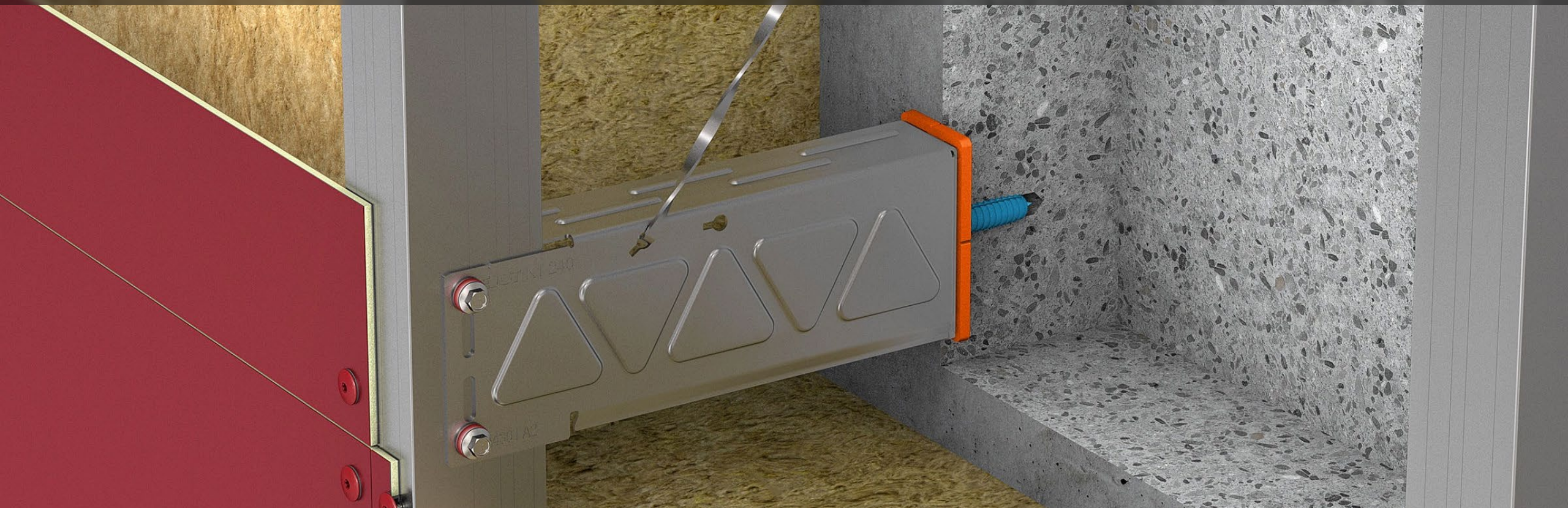
Facade brackets certified by building authorities or incl. FEA calculation





Connecting Strength

Facade brackets certified by building authorities or incl. FEA calculation



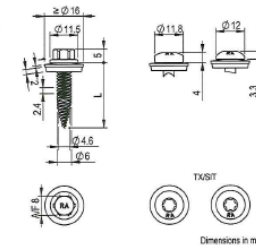


Connecting Strength

Thin metal sheet screws with ETA-21/0306



ETA-21/0306
of 21.04.2021



Materials

Fastener stainless steel - EN 10088
steel grade 1.4301, 1.4401, 1.4567, 1.4578

Washer stainless steel - EN 10088
steel grade 1.4301 or 1.4401
with EPDM sealing washer

Component I aluminum
 $R_{e,t} \geq 165 \text{ N/mm}^2$ - EN 573
 $R_{e,t} \geq 215 \text{ N/mm}^2$ - EN 573

Component II S235 - EN 10025-1
S280GD, S320GD - EN 10346

Drilling performance $Z \leq 3.00 \text{ mm}$

Timber substructure
Performance not assessed

	Component II, steel t_b in mm											
	0.40	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	1.50	2.00	
Component I, t_b in mm aluminum $R_{e,t} \geq 165 \text{ N/mm}^2$ $V_{k,t} \geq 0.80$	0.40	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	-	-
	0.50	0.08	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	-	-
	0.60	0.08	0.53	0.70	0.81	0.81	0.81	0.81	0.81	0.81	-	-
	0.70	0.08	0.53	0.70	0.81	0.81	0.81	0.81	0.85	0.89	0.97	-
	0.80	0.08	0.53	0.70	0.81	0.81	0.82	0.89	0.95	1.01	1.14	-
	0.90	0.08	0.53	0.73	0.89	0.97	1.39	1.39	1.39	1.39	1.39	-
	1.00	0.08	0.53	0.74	0.90	0.97	1.39	1.68	1.68	1.68	1.68	-
	1.20	0.08	0.53	0.74	0.90	0.97	1.39	1.68	1.73	1.94	1.94	-
	1.50	0.08	0.53	0.74	0.90	0.97	1.39	1.68	1.73	1.94	2.34	-
	2.00	0.08	0.53	0.74	0.90	0.97	1.39	1.68	-	-	-	-
$N_{R,t,k}$ in kN ¹⁾	0.59	0.87	0.99	1.18	1.47	1.87	2.23	2.40	2.55	2.55	-	

	Component II, steel t_b in mm											
	0.40	0.50	0.55	0.63	0.75	0.88	1.00	1.13	1.25	1.50	2.00	
Component I, t_b in mm aluminum $R_{e,t} \geq 215 \text{ N/mm}^2$ $V_{k,t} \geq 0.80$	0.40	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	-	-
	0.50	0.11	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	-
	0.60	0.11	0.82	0.91	1.05	1.05	1.05	1.05	1.05	1.05	1.05	-
	0.70	0.11	0.82	0.91	1.05	1.05	1.05	1.05	1.10	1.15	1.27	-
	0.80	0.11	0.82	0.91	1.05	1.05	1.05	1.09	1.16	1.23	1.36	-
	0.90	0.11	0.82	0.91	1.05	1.05	1.15	1.27	1.38	1.49	1.71	-
	1.00	0.11	0.82	0.96	1.05	1.27	1.70	2.19	2.19	2.19	2.19	-
	1.20	0.11	0.82	0.96	1.05	1.27	1.70	2.19	2.26	2.53	2.53	-
	1.50	0.11	0.82	0.96	1.05	1.27	1.70	2.19	2.26	2.53	3.05	-
	2.00	0.11	0.82	0.96	1.05	1.27	1.70	2.19	-	-	-	-
$N_{R,t,k}$ in kN ¹⁾	0.59	0.87	0.99	1.18	1.47	1.87	2.23	2.40	2.55	2.55	-	

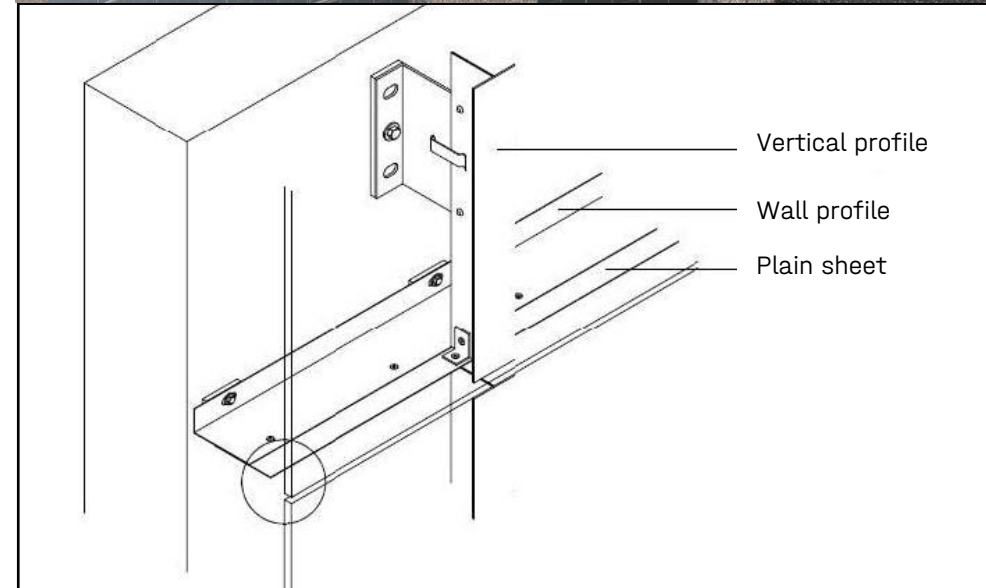
¹⁾ For $N_{R,t,k}$ see Annex 3.1.



Connecting Strength

Fire protection

- K2 WallPV offers many **options for Fire-retarding sealing**
- **Project-specific requirement** according to authorised fire protection experts.
Important factors:
building class, safety class, fire resistance time, fire spread, escape routes, etc.
- **Fire-retarding sealings** limit the spread of fire locally for a certain time slot, e.g. 30 min.
- **Module blocks sizes can be designed** acc. protection demands
- **Systems give connection options** for designed protection devices





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How to go on...

- **More information and checklist**
k2-systems.com/wallpv
- **Questions**
service@k2-systems.com



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Q&A



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Japanese scientists design flexible crystalline silicon solar modules with PET front cover

by Emiliano Bellini



Most-read online!

Combination of half-cut, bifacial solar cell designs may contribute to hotspot formation

by Mark Hutchins



Coming up next...

Thursday, 19 October 2023

1:00 pm - 2:00 pm CEST, Berlin
2:00 pm - 3:00 pm AST, Riyadh

Wednesday, 1 November 2023

3:00 pm - 4:00 pm GMT, London
4:00 pm - 5:00 pm CET, Berlin

Many more to come!

**Securing
successful solar
project financing
via sustainability
standards**

**Optimizing fast-
growing solar
energy
portfolios**

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joining today!**