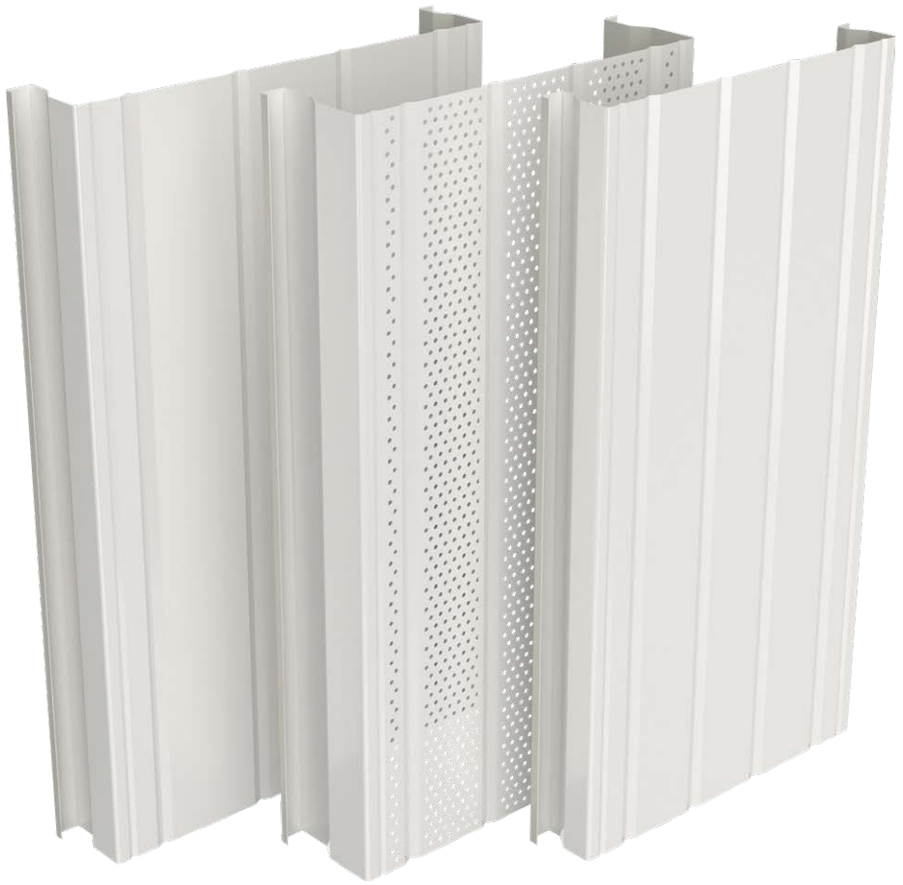
PLATEAU®

COLD-FORMED STEEL TRAY PROFILES



FOR SELF-SUPPORTING FAÇADES

361metal

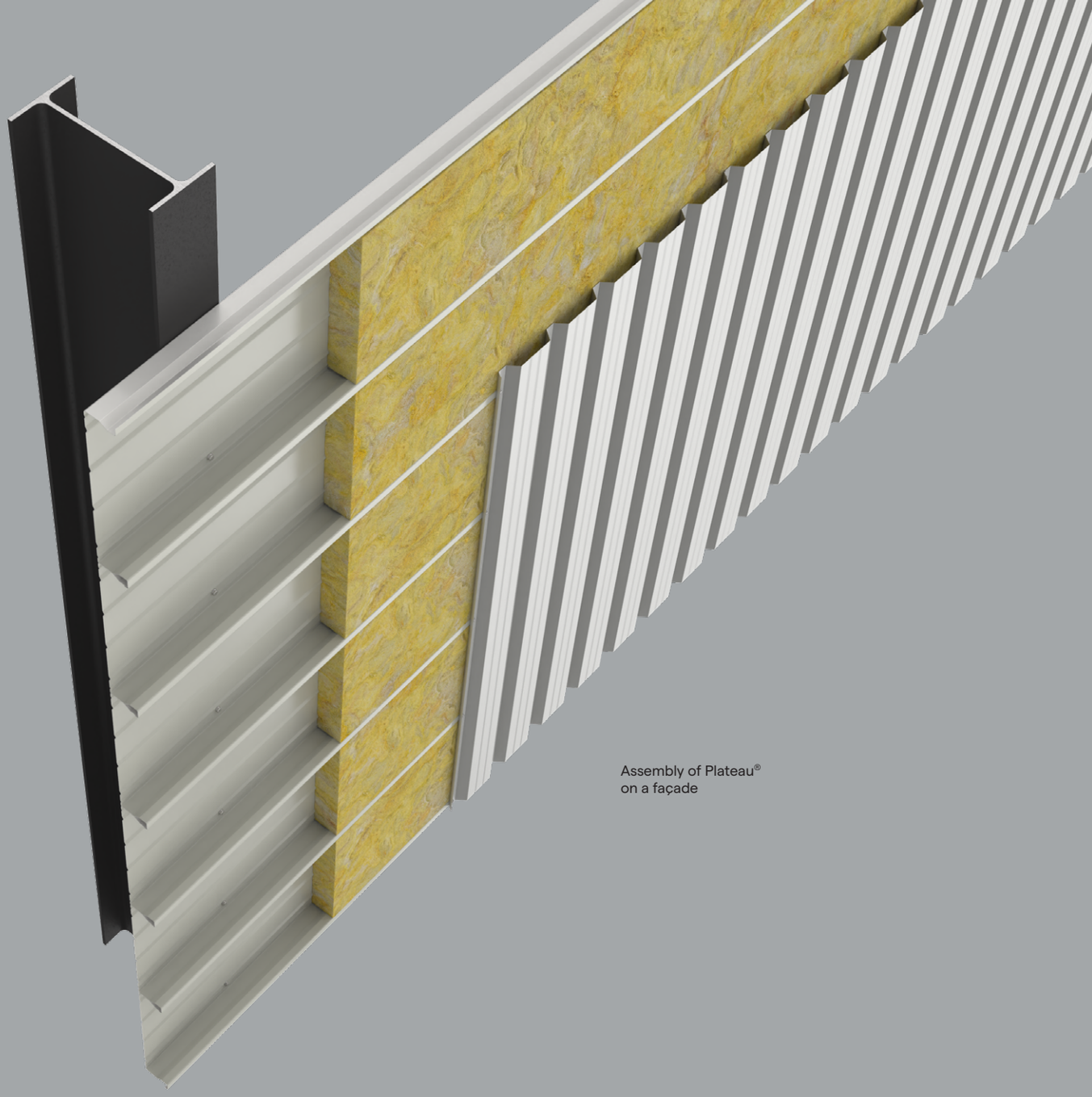
INDEX

361 METAL

Created in 2021, integrated into a market-leading group in metal solutions for construction, 361 Metal combines an experienced and dynamic team with modern production facilities and top-quality raw materials to produce and supply the most efficient solutions in structural metal profiles.

361 Metal has its headquarters and manufacturing facilities in Braga, where it develops its industrial activity in metal forming and steel services. The network of commercial warehouses and distributors ensures direct sales and logistical distribution throughout the Iberian Peninsula.

361 Metal headquarters
Braga, Portugal



Assembly of Plateau®
on a façade

Certification
CE Marking

CE Marking is the form of harmonization and unification of procedures, standards, and legislation aimed at realizing the European internal market.

Since its creation in 1992, CE Marking ensures compliance with product standardization and essential safety, health, and environmental requirements.

CE Marking certifies that 361 Metal manufactures products in accordance with the technical requirements for cold-formed steel elements and structures, for roofs, ceilings, floors, and walls as prescribed in EN 1090 parts 2 and 4.

Thus, CE Marking guarantees that 361 Metal supplies products in complete conformity with their declared performance.

CE

PLATEAU® PROFILE

The Plateau® system consists of a range of tray-type profiles for making self-supporting façade and roof systems that can be applied directly to the main structure, while providing the interior finish of the building.

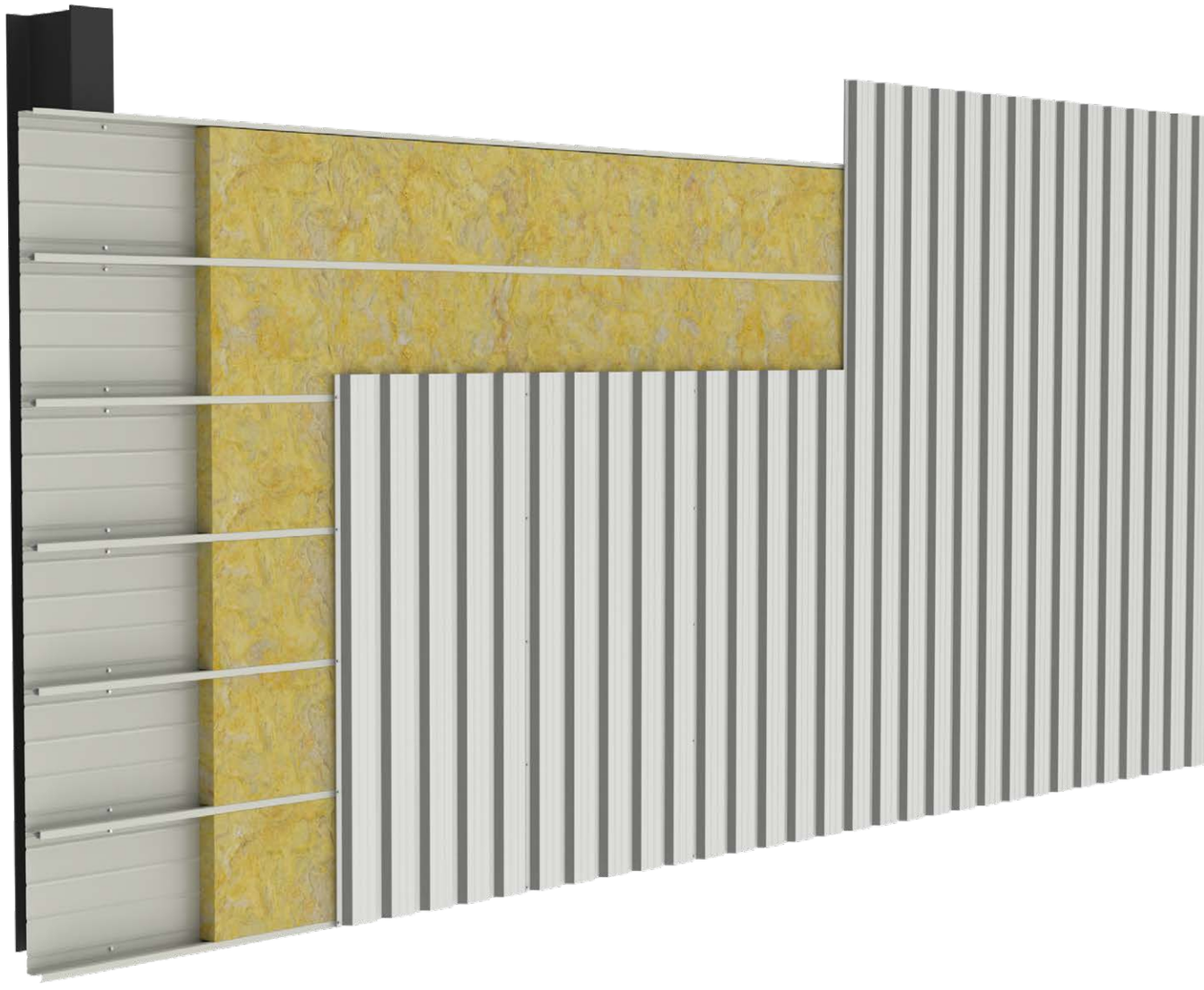
This solution can be applied directly to steel, wood or concrete structures, eliminating the need for a secondary structure. It can overcome spans of up to 8 metres and thus makes it possible to achieve solutions with a good cost-performance ratio.

THERMAL INSULATION
With different box dimensions, the system can accommodate 70 mm, 90 mm and 120 mm thick mineral wool or PIR panels, thus providing different levels of thermal insulation.

ACOUSTIC INSULATION
In its perforated version and using suitable mineral wool, the Plateau® System offers the best performance in terms of acoustic insulation for walls and ceilings.

FIRE BEHAVIOUR
A non-combustible product, this system is considered Class A in terms of reaction to fire.

DIMENSIONAL STABILITY
The Plateau® tray system guarantees the flatness of surfaces over time and is not subject to surface changes afterwards.



Assembly of Plateau®
on a façade

Plateau® profiles are produced by cold-forming galvanised S320GD structural steel sheet with thicknesses ranging from 0,6 mm to 1,2 mm.

Cold roll forming is a continuous forming process with high dimensional accuracy. It allows the production of profiled sheets with lengths adapted to the project, with their size essentially limited to the logistics associated with transport and assembly.

Plateau® 500 without perforation

Production line
Braga, Portugal

CHARACTERIZATION AND TESTING

ANALYTICAL CHARACTERISATION

Cold-formed profiles with reduced thicknesses exhibit significant slenderness levels in their components (flanges, webs, and stiffeners). Therefore, they are sensitive to local and distortional buckling effects, which occur at stress levels below the material's yield stress. As such, they are typically classified as class 4 according to Eurocode 3.

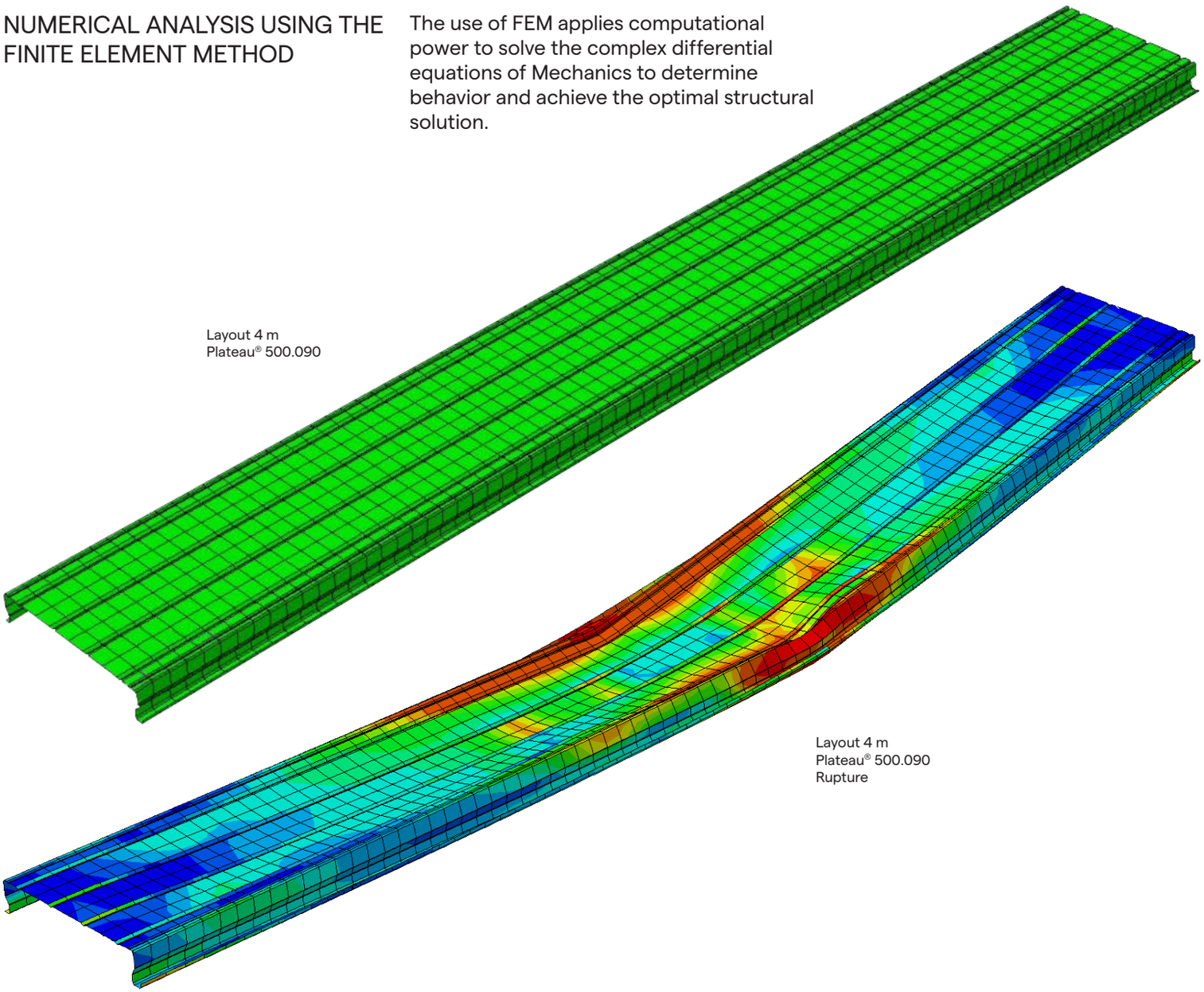
The safety verification procedure provided in Eurocode 3 for this type of metal profiles is defined in Parts 1-3 and 1-5 of the standard, which is based on the concept of effective widths.

The determination of the effective sections of class 4 metal profiles is based on the determination of the reduction factor due to buckling for each component of the cross-section (flanges and webs).

This reduction factor depends on the normalized slenderness coefficient and the distribution of normal stresses in each component. The location and size of the effective areas of the section are defined in clause 5.5.2 of Part 1-3 of Eurocode 3 for internal and external elements.

NUMERICAL ANALYSIS USING THE FINITE ELEMENT METHOD

The use of FEM applies computational power to solve the complex differential equations of Mechanics to determine behavior and achieve the optimal structural solution.



Layout 4 m
Plateau® 500.090

Layout 4 m
Plateau® 500.090
Rupture

CHARACTERIZATION AND TESTING

EXPERIMENTAL TESTING

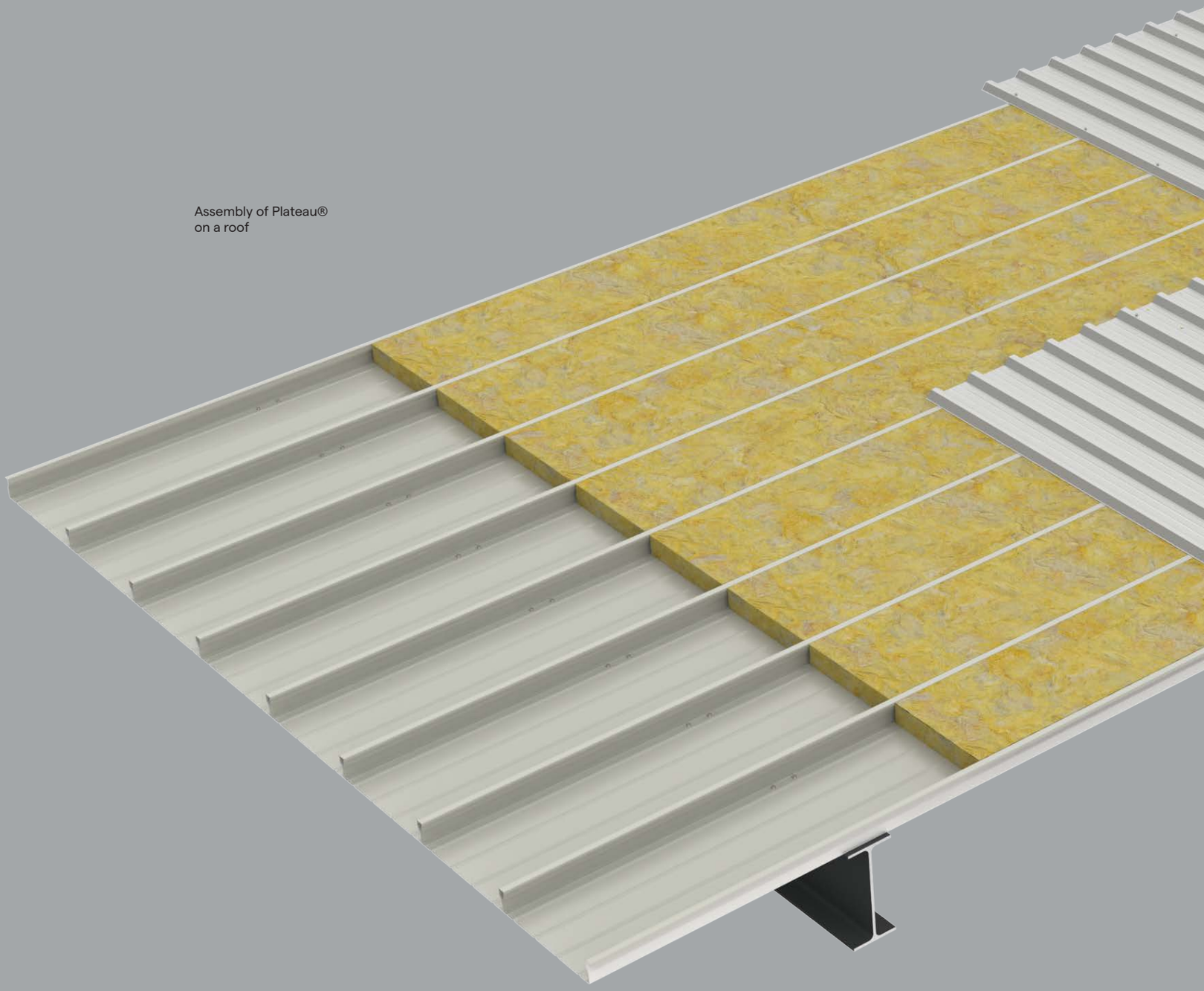
Plateau® profiles underwent an exhaustive program aimed at fully characterizing their performance.

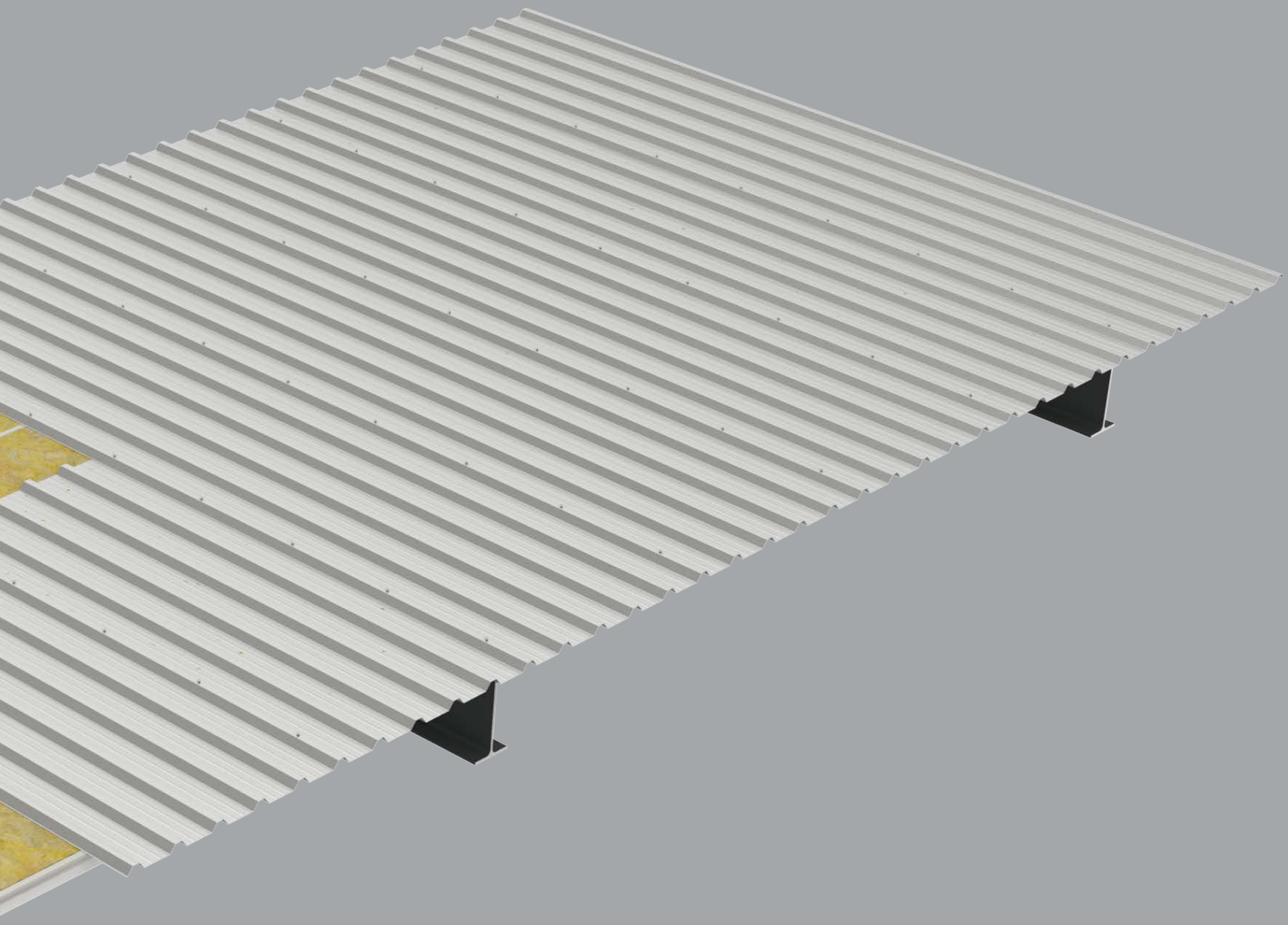
The process was developed through a partnership between 361 Metal and the Faculty of Engineering of the University of Porto and was based on the methodology summarized below:

→ Definition of geometric properties using the analytical method recommended by Eurocode;
→ Experimental campaign to validate the geometric properties measured by the analytical characterisation.

Conducting test
FEUP, Porto

Assembly of Plateau®
on a roof





361 SELEKTOR PLATFORM

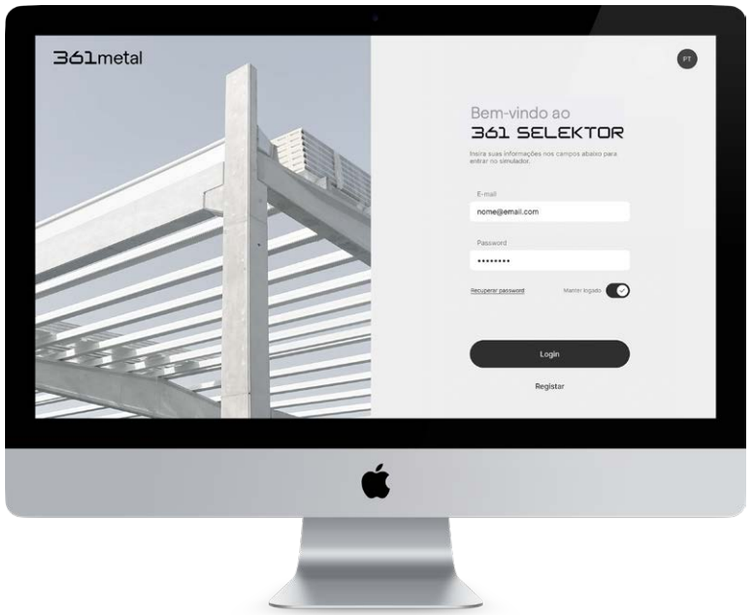
STRUCTURAL CALCULATION TOOL FOR DESIGNERS

361 Metal offers a tool to support designers in correctly dimensioning their products in accordance with the Structural Eurocodes.
This tool has the following features, among others:

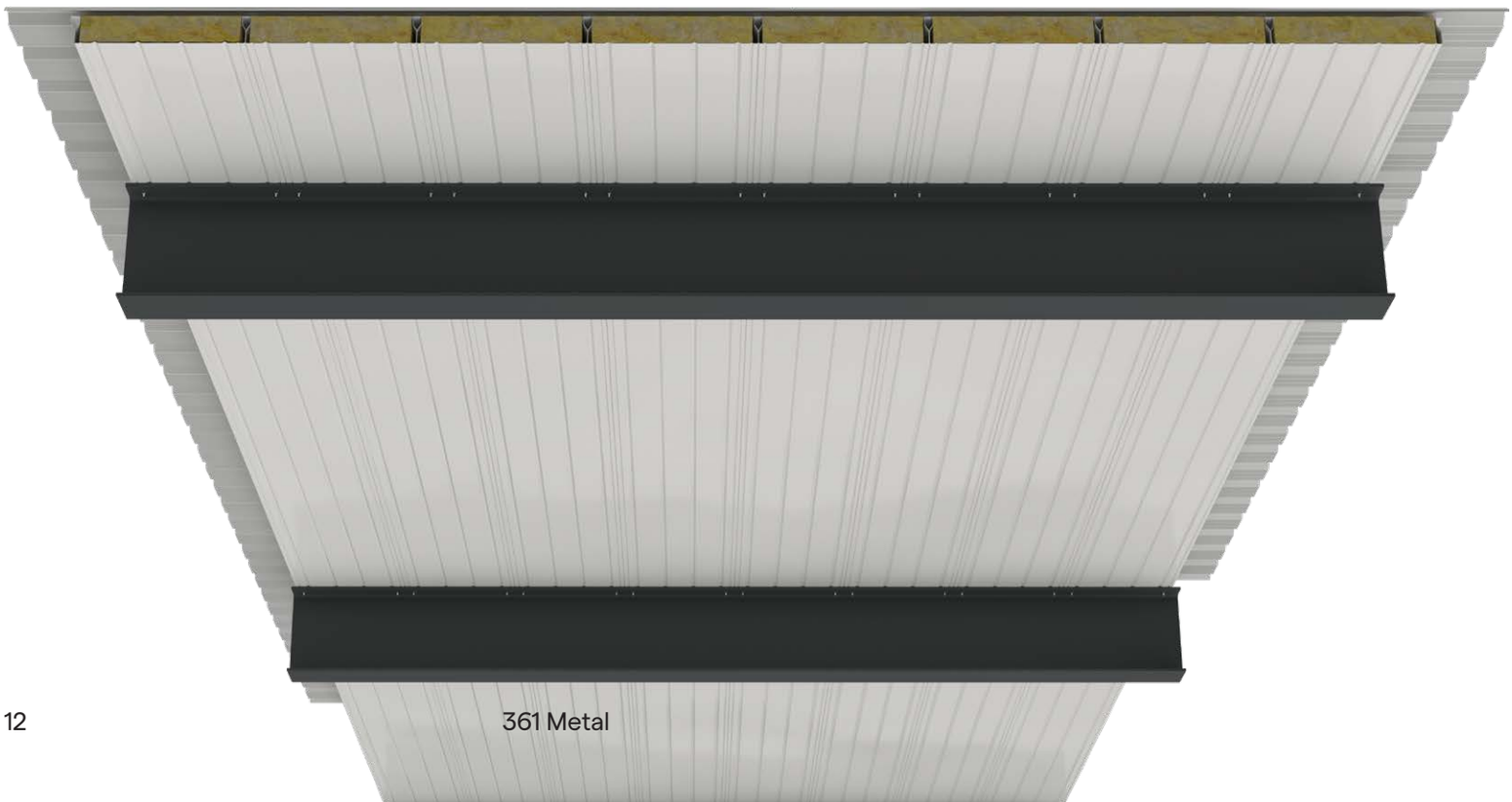
→ Selection of the optimised and most suitable solution for a given use;
→ Use of an expeditious design methodology even for designers with less experience in using these products;
→ Issuing calculation notes in multilingual format.

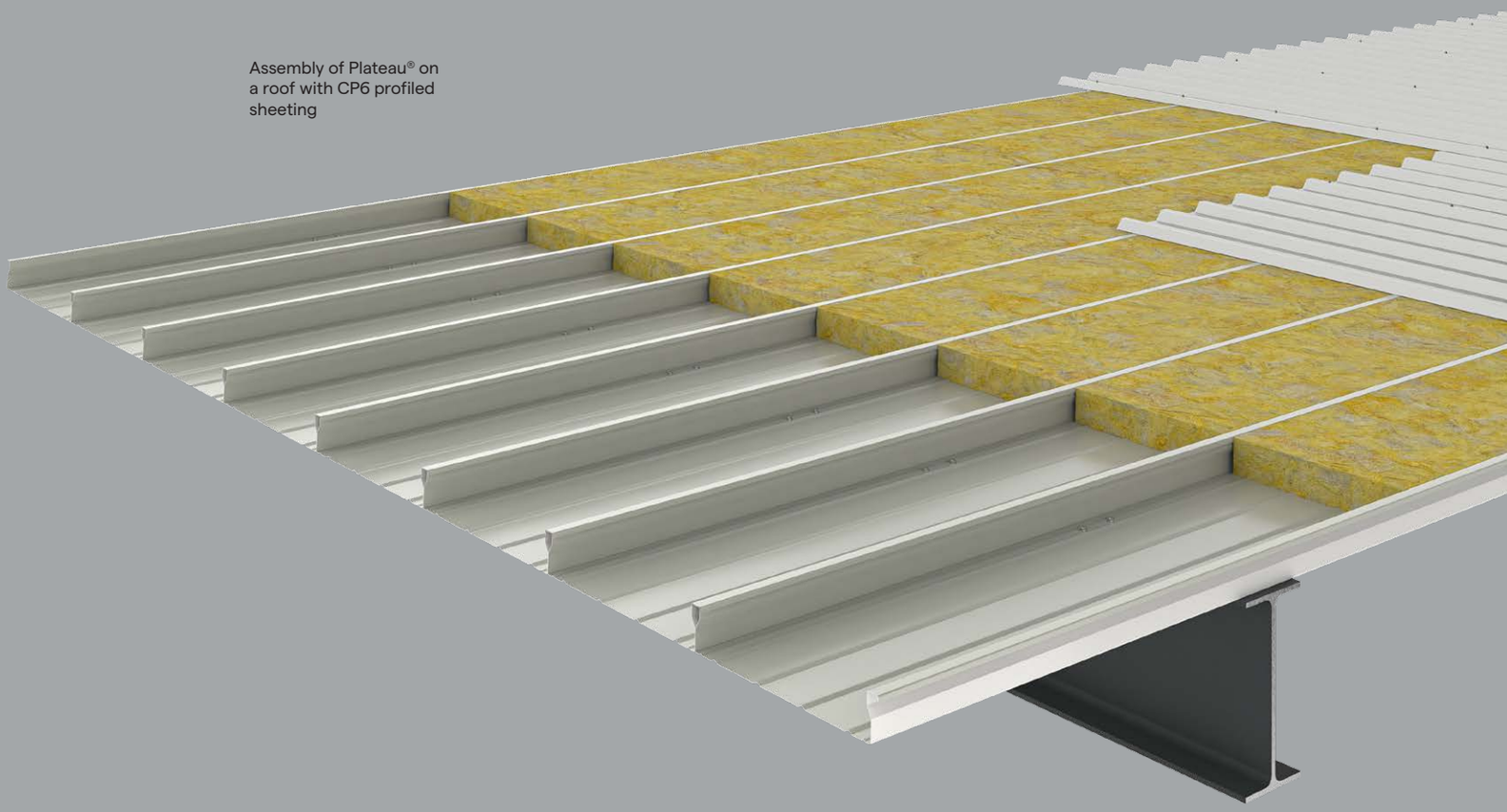
Application available at 361metal.com and 361selektor.com

Note: the structural calculation process must always be carried out by a qualified technician. 361 Metal has qualified technicians to support the prescription of the products it sells.



Assembly of Plateau®
on a roof



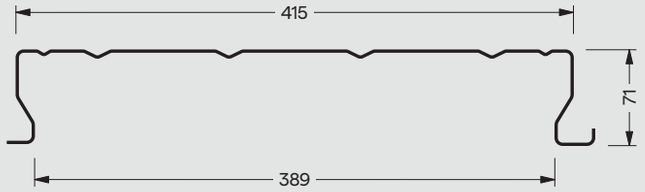


Assembly of Plateau® on a roof with CP6 profiled sheeting

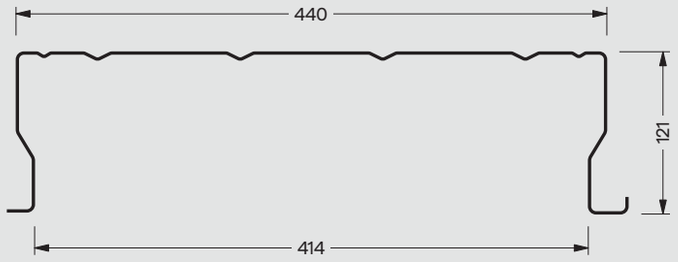
THE PROFILES

Plateau® profiles are available on the market in 3 versions, defined by their usable width, which varies between 415 → 440 → 500, each with variants depending on their thickness. The thickness of the sections varies between 0,6 and 1,2 mm.

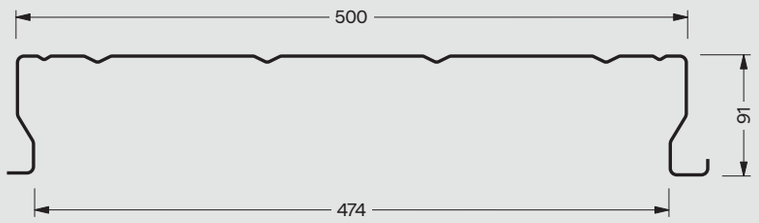
Plateau® 415.070



Plateau® 440.120



Plateau® 500.090



SECTION	WEIGHT	HEIGHT	WIDTH	THICKNESS
				Nominal
		h	b	t_{nom}
	Kg/m	mm	mm	mm
Plateau® 415×0,60	2,98	70	440	0,60
Plateau® 415×0,70	3,48	70	440	0,70
Plateau® 415×0,75	3,73	70	440	0,75
Plateau® 415×1,00	4,97	70	440	1,00
Plateau® 415×1,20	5,97	70	440	1,20
Plateau® 440×0,60	3,57	120	465	0,60
Plateau® 440×0,70	4,17	120	465	0,70
Plateau® 440×0,75	4,47	120	465	0,75
Plateau® 440×1,00	5,95	120	465	1,00
Plateau® 440×1,20	7,14	120	465	1,20
Plateau® 500×0,60	3,57	90	525	0,60
Plateau® 500×0,70	4,17	90	525	0,70
Plateau® 500×0,75	4,47	90	525	0,75
Plateau® 500×1,00	5,96	90	525	1,00
Plateau® 500×1,20	7,15	90	525	1,20

MATERIAL

The base material used in the manufacture of Plateau® profiles is pre-lacquered galvanised structural steel S320GD+Z200 according to standard EN 10346.

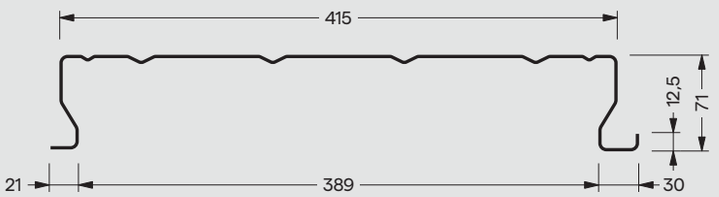
STEEL CLASS	YIELD STRESS	TENSILE STRESS
	Mpa	Mpa
S320GD+Z200	320	390

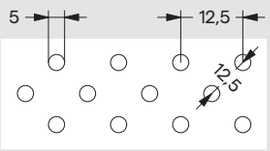
On request, different types of steel can also be used or with different types of metallic coating such as Zinc-Magnesium (ZM).

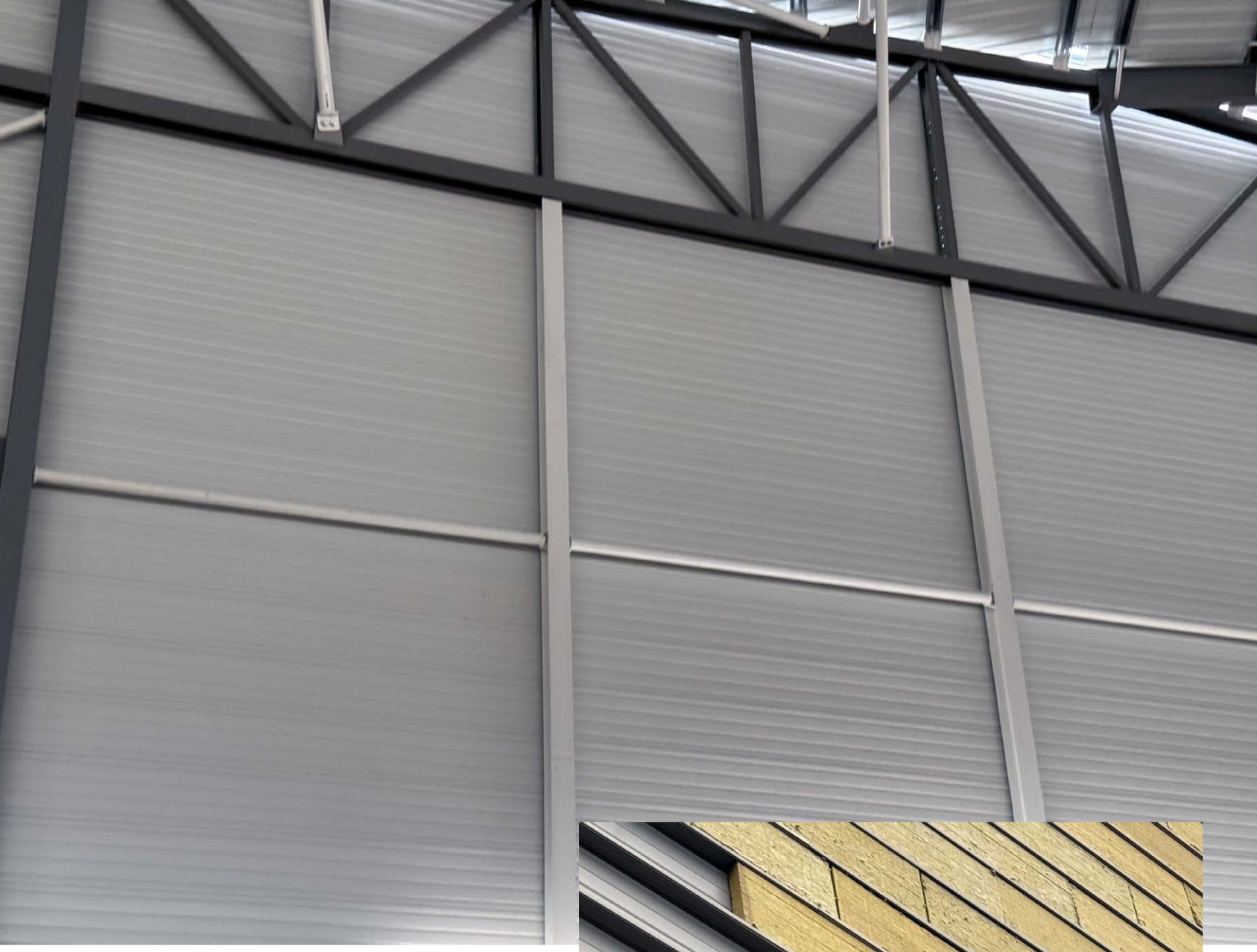
The standard organic coating consists of a 25 µm polyester lacquer. Also under conditions to be defined on request, the profiles can be produced with a 35 µm PVDF or 55 µm HDX coating.

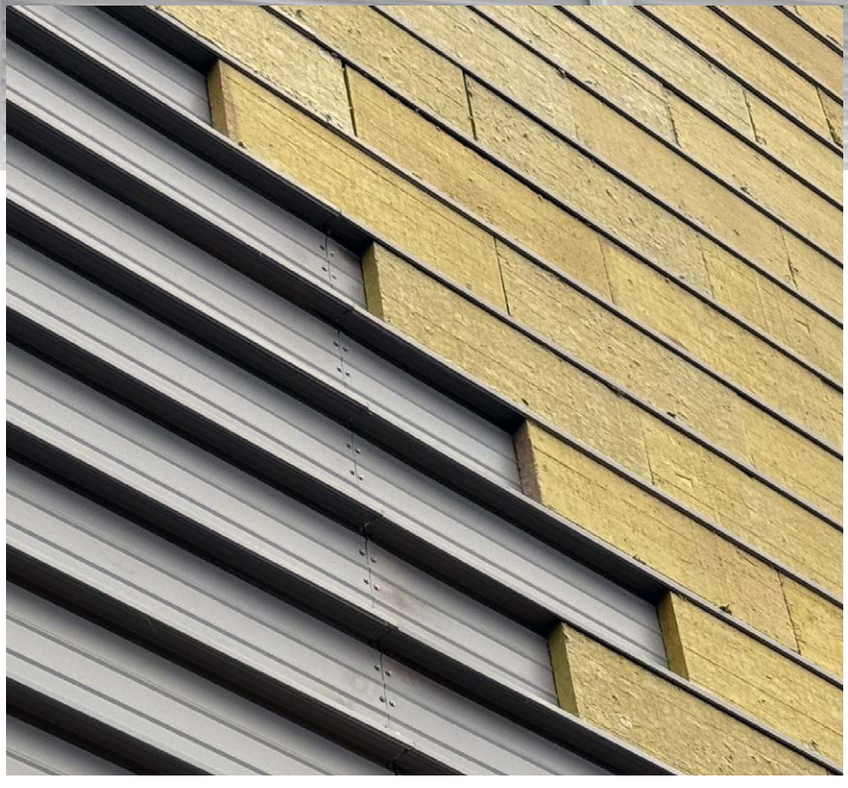
ACOUSTIC PLATEAU®

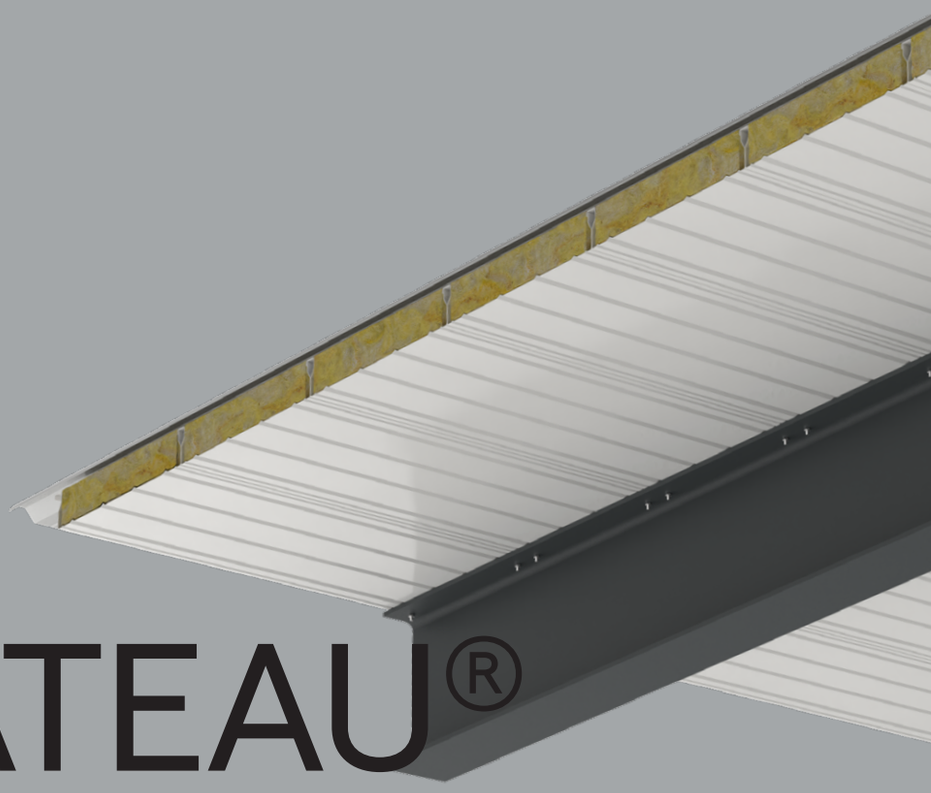
Plateau® acoustic profiles are manufactured with perforations on the exposed side of the profile. With the indicated mineral wool insulation, this solution makes it possible to create walls and ceilings with high acoustic performance.







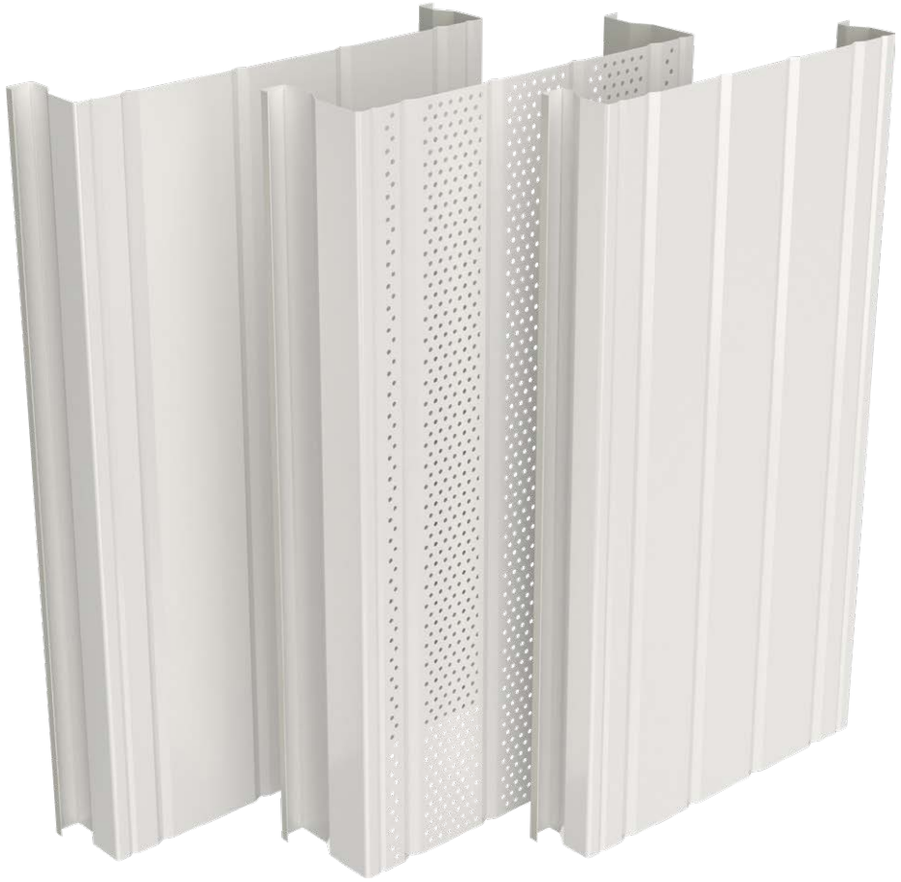




PLATEAU®
RANGE

415 → 440 → 500

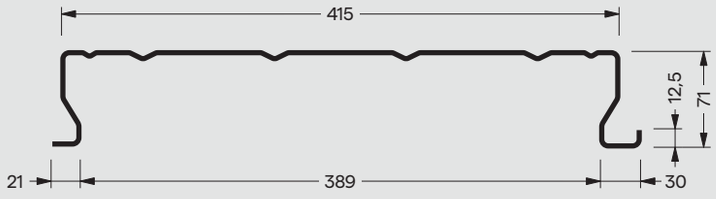
GEOMETRY



PROPERTIES

PLATEAU® 415

SECTION GEOMETRY



GROSS SECTION PROPERTIES

SECTION	WEIGHT	HEIGHT	WIDTH	THICKNESS		GROSS SECTION PROPERTIES										
				Nomi.	Effect.											
		h	b	t_{nom}	t_{eff}	A_{gross}	$I_{y,gross}$	$I_{z,gross}$	$W_{y,gross}$	$W_{z,gross}$	I_w	I_t	Y_{cg}	Y_{cc}	Z_{cg}	Z_{cc}
	Kg/m	mm	mm	mm	mm	mm^2	$\times 10^4\ mm^4$	$\times 10^4\ mm^4$	mm^3	mm^3	$\times 10^6\ mm^6$	mm^4	mm	mm	mm	mm
Plateau® 415×0,60	2,98	70	440	0,60	0,56	355	21,2	829,6	3845	37178	6114	37	223	236	53	93
Plateau® 415×0,70	3,48	70	440	0,70	0,66	418	25,0	977,8	4528	43817	7206	61	223	236	53	93
Plateau® 415×0,75	3,73	70	440	0,75	0,71	450	26,9	1051,8	4869	47137	7752	76	223	236	53	93
Plateau® 415×1,00	4,97	70	440	1,00	0,96	608	36,4	1422,2	6569	63735	10481	187	223	236	49	93
Plateau® 415×1,20	5,97	70	440	1,20	1,16	735	44,0	1718,5	7924	77013	12665	330	223	236	53	93

Note: the weights indicated in the tables are theoretical weights estimated based on the nominal dimensions of the cross-section, with variations occurring within the tolerances provided in standard EN 10051.

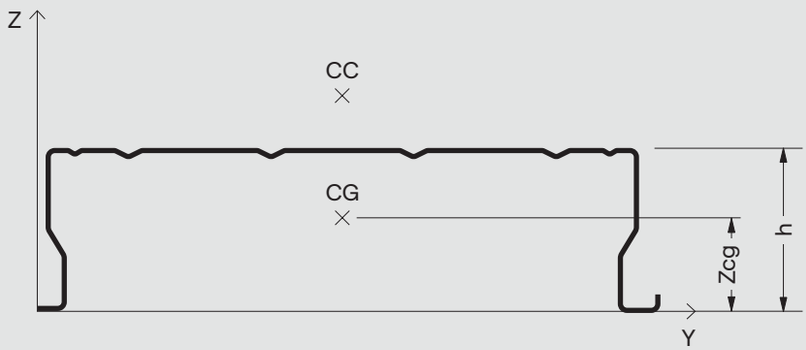
EFFECTIVE SECTION PROPERTIES

S320 GD

SECTION	COMPRESSION			Y-AXIS POSITIVE FLEXION					Y-AXIS NEGATIVE FLEXION					Z-AXIS POSITIVE FLEXION					Z-AXIS NEGATIVE FLEXION				
	A_{eff}	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{y,eff}$	$W_{y,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{y,eff}$	$W_{y,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{z,eff}$	$W_{z,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{z,eff}$	$W_{z,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$
	mm^2	mm	mm	mm^2	$\times 10^4\ mm^4$	mm^3	mm	mm	mm^2	$\times 10^4\ mm^4$	mm^3	mm	mm	mm^2	$\times 10^4\ mm^4$	mm^3	mm	mm	mm^2	$\times 10^4\ mm^4$	mm^3	mm	mm
Plateau® 415×0,60	151	227	44	184	14,3	3187	229	40	337	15,9	2650	221	56	266	628,1	24390	183	52	261	607,4	22861	267	51
Plateau® 415×0,70	196	227	44	227	17,6	3816	230	41	400	19,7	3277	221	56	323	781,5	31062	189	52	318	757,8	29183	260	51
Plateau® 415×0,75	219	228	45	248	19,2	4126	229	42	432	21,6	3602	222	56	352	859,6	34509	192	56	347	833,7	32420	258	51
Plateau® 415×1,00	342	228	45	360	27,6	5684	229	43	593	31,9	5317	223	55	498	1249,4	51942	201	51	495	1214,1	48915	249	51
Plateau® 415×1,20	442	227	46	456	34,5	6969	228	45	721	39,9	6709	222	54	615	1548,6	65316	205	52	611	1515,5	62049	245	52

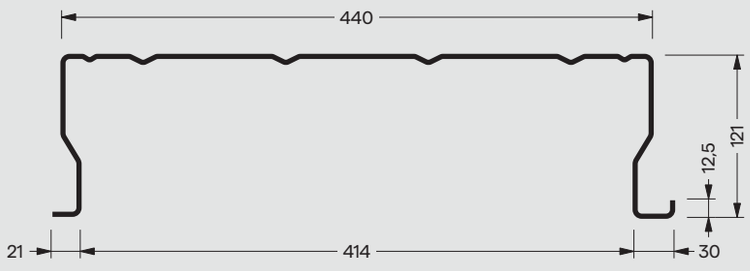
Subtitles

A_{gross}	Gross section area
$I_{y,gross}$	Gross section inertia yy-axis
$I_{z,gross}$	Gross section inertia zz-axis
I_w	Warping constant
I_t	Torsion inertia
CG	Coordinates of the center of gravity
CC	Coordinates of the shear center
A_{eff}	Effective section area
$I_{y,eff}$	Effective section inertia yy-axis
$W_{y,eff}$	Bending modulus of the effective section yy-axis
$I_{z,eff}$	Effective section inertia zz-axis
$W_{z,eff}$	Bending modulus of the effective section zz-axis



PLATEAU® 440

SECTION GEOMETRY



GROSS SECTION PROPERTIES

SECTION	WEIGHT	HEIGHT	WIDTH	THICKNESS		GROSS SECTION PROPERTIES									
				Nomi.	Effect.										
		h	b	t_{nom}	t_{eff}	A_{gross}	$I_{y,gross}$	$I_{z,gross}$	$W_{y,gross}$	$W_{z,gross}$	I_w	I_t	Y_{cg}	Y_{cc}	Z_{cg}	Z_{cc}
	Kg/m	mm	mm	mm	mm	mm^2	$\times 10^4\,mm^4$	$\times 10^4\,mm^4$	mm^3	mm^3	$\times 10^6\,mm^6$	mm^4	mm	mm	mm	mm
Plateau® 440×0,60	3,57	120	465	0,60	0,56	425	76,9	1212,0	8457	51627	25207	44	235	244	89	165
Plateau® 440×0,70	4,17	120	465	0,70	0,66	501	90,7	1428,4	9962	60846	97080	73	235	244	89	165
Plateau® 440×0,75	4,47	120	465	0,75	0,71	538	97,6	1536,6	10714	65456	31959	91	235	244	89	165
Plateau® 440×1,00	5,95	120	465	1,00	0,96	728	131,9	2077,7	14467	88504	43212	224	235	244	89	165
Plateau® 440×1,20	7,14	120	465	1,20	1,16	880	159,4	2510,6	17462	106940	52210	395	235	244	89	165

Note: the weights indicated in the tables are theoretical weights estimated based on the nominal dimensions of the cross-section, with variations occurring within the tolerances provided in standard EN 10051.

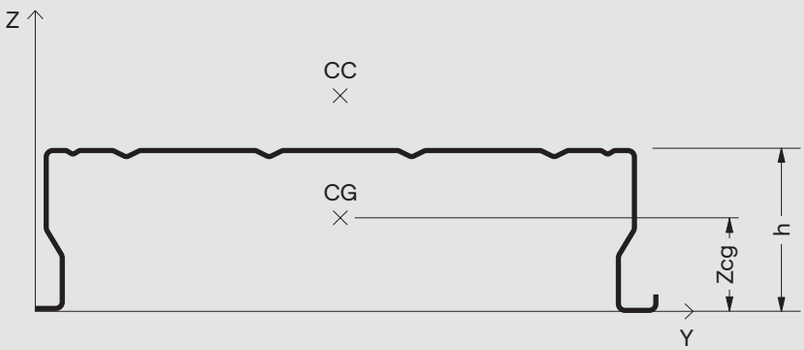
EFFECTIVE SECTION PROPERTIES

S320 GD

SECTION	COMPRESSION			Y-AXIS POSITIVE FLEXION					Y-AXIS NEGATIVE FLEXION					Z-AXIS POSITIVE FLEXION					Z-AXIS NEGATIVE FLEXION				
	A_{eff}	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{y,eff}$	$W_{y,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{y,eff}$	$W_{y,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{z,eff}$	$W_{z,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{z,eff}$	$W_{z,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$
	mm^2	mm	mm	mm^2	$\times 10^4\,mm^4$	mm^3	mm	mm	mm^2	$\times 10^4\,mm^4$	mm^3	mm	mm	mm^2	$\times 10^4\,mm^4$	mm^3	mm	mm	mm^2	$\times 10^4\,mm^4$	mm^3	mm	mm
Plateau® 440×0,60	161	238	75	218	47,8	6751	237	64	385	52,5	5139	235	97	305	828,6	28876	179	87	302	800,2	27586	293	85
Plateau® 440×0,70	213	238	75	270	59,3	8094	237	67	466	67,6	6745	234	95	373	1046,6	37470	187	87	369	1014,0	35850	285	85
Plateau® 440×0,75	240	238	75	308	65,2	8768	237	68	507	75,5	7582	234	94	407	1157,7	41922	191	87	403	1123,3	40157	282	85
Plateau® 440×1,00	387	238	74	452	95,3	12230	238	72	710	117,6	12077	234	91	582	1724,8	65211	203	86	580	1683,3	62867	269	85
Plateau® 440×1,20	516	238	75	568	119,5	15005	238	73	847	147,2	15223	234	91	727	2189,6	84868	210	86	726	2154,1	82558	262	85

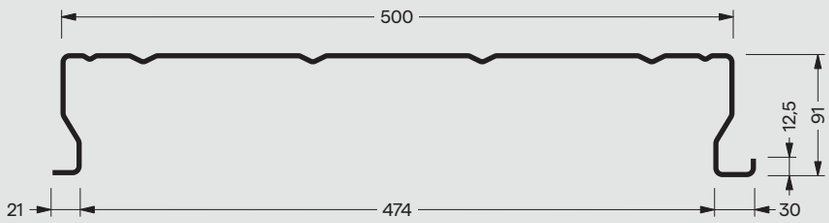
Subtitles

A_{gross} Gross section area
$I_{y,gross}$ Gross section inertia yy-axis
$I_{z,gross}$ Gross section inertia zz-axis
I_w Warping constant
I_t Torsion inertia
CG Coordinates of the center of gravity
CC Coordinates of the shear center
A_{eff} Effective section area
$I_{y,eff}$ Effective section inertia yy-axis
$W_{y,eff}$ Bending modulus of the effective section yy-axis
$I_{z,eff}$ Effective section inertia zz-axis
$W_{z,eff}$ Bending modulus of the effective section zz-axis



PLATEAU® 500

SECTION GEOMETRY



GROSS SECTION PROPERTIES

SECTION	WEIGHT	HEIGHT	WIDTH	THICKNESS		GROSS SECTION PROPERTIES										
				Nomi.	Effect.											
		h	b	t_{nom}	t_{eff}	A_{gross}	$I_{y,gross}$	$I_{z,gross}$	$W_{y,gross}$	$W_{z,gross}$	I_w	I_t	Y_{cg}	Y_{cc}	Z_{cg}	Z_{cc}
	Kg/m	mm	mm	mm	mm	mm^2	$\times 10^4\,mm^4$	$\times 10^4\,mm^4$	mm^3	mm^3	$\times 10^6\,mm^6$	mm^4	mm	mm	mm	mm
Plateau® 500×0,60	3,57	90	525	0,60	0,56	425	40,1	1441,1	5583	54254	17150	44	266	282	70	120
Plateau® 500×0,70	4,17	90	525	0,70	0,66	501	47,2	1698,4	6575	63943	20212	73	266	282	70	120
Plateau® 500×0,75	4,47	90	525	0,75	0,71	539	50,8	1827,1	7071	68787	21743	91	266	282	70	120
Plateau® 500×1,00	5,96	90	525	1,00	0,96	728	68,7	2470,5	9545	93008	29399	224	266	282	70	120
Plateau® 500×1,20	7,15	90	525	1,20	1,16	880	83,0	2985,1	11518	112380	35524	395	266	282	70	120

Note: the weights indicated in the tables are theoretical weights estimated based on the nominal dimensions of the cross-section, with variations occurring within the tolerances provided in standard EN 10051.

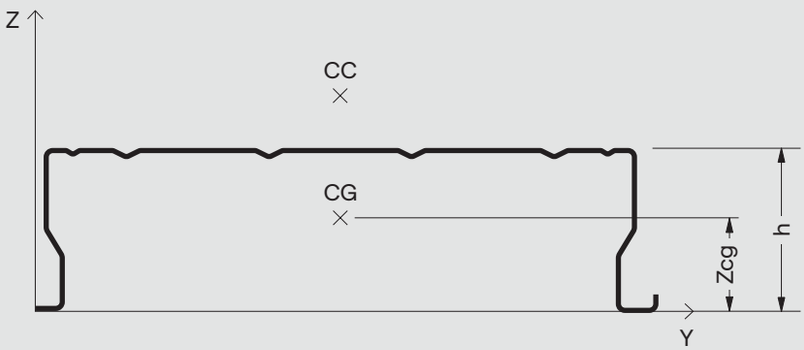
EFFECTIVE SECTION PROPERTIES

S320 GD

SECTION	COMPRESSION			Y-AXIS POSITIVE FLEXION					Y-AXIS NEGATIVE FLEXION					Z-AXIS POSITIVE FLEXION					Z-AXIS NEGATIVE FLEXION				
	A_{eff}	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{y,eff}$	$W_{y,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{y,eff}$	$W_{y,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{z,eff}$	$W_{z,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$	A_{eff}	$I_{z,eff}$	$W_{z,eff}$	$Y_{cg,eff}$	$Z_{cg,eff}$
	mm^2	mm	mm	mm^2	$\times 10^4\,mm^4$	mm^3	mm	mm	mm^2	$\times 10^4\,mm^4$	mm^3	mm	mm	mm^2	$\times 10^4\,mm^4$	mm^3	mm	mm	mm^2	$\times 10^4\,mm^4$	mm^3	mm	mm
Plateau® 500×0,60	154	271	56	195	24,7	4478	271	50	402	29,8	3836	265	74	302	1061,0	31860	208	68	299	982,8	30071	328	67
Plateau® 500×0,70	203	271	55	245	30,5	5359	270	51	482	37,9	4931	264	73	369	1278,8	41157	216	67	364	1239,6	38870	319	66
Plateau® 500×0,75	228	271	55	269	33,4	5819	272	52	520	41,5	5399	264	73	403	1412,3	45966	219	67	397	1370,1	43417	316	66
Plateau® 500×1,00	356	271	56	389	48,1	8067	272	54	712	60,5	7882	265	72	574	2067,1	69789	230	67	565	2004,1	65763	305	66
Plateau® 500×1,20	466	270	57	490	60,3	9865	272	56	865	75,6	9904	265	71	711	2592,0	89157	236	67	706	2534,4	85034	298	66

Subtitles

A_{gross}	Gross section area
$I_{y,gross}$	Gross section inertia yy-axis
$I_{z,gross}$	Gross section inertia zz-axis
I_w	Warping constant
I_t	Torsion inertia
CG	Coordinates of the center of gravity
CC	Coordinates of the shear center
A_{eff}	Effective section area
$I_{y,eff}$	Effective section inertia yy-axis
$W_{y,eff}$	Bending modulus of the effective section yy-axis
$I_{z,eff}$	Effective section inertia zz-axis
$W_{z,eff}$	Bending modulus of the effective section zz-axis



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