

Technical Data Sheet

UltraCor®



ULTRACOR®

This technical data sheet is valid for the ViaCon Polska Sp. z o.o. production plant in Rydzyna, Poland only.
CE Certificate of Factory Production Control No. 1023-CPR-0640 F.
Steel structures and aluminium structures according to EN 1090-1.
Issued by notified body no. 1023

DESCRIPTION

Flexible, cold-formed, corrugated steel plates, connected with bolts and nuts, used mainly in civil engineering as soil-steel composite structures, under railway and roadway traffic loads.

INTENDED USE

- culverts
- bridges
- grade separations/viaducts
- tunnels
- underpasses
- ecological crossings
- pedestrian tunnels
- shelters
- hangars
- underground storage

PRODUCT FEATURES

- high structural strength
- wide range of shapes and sizes
- relatively low weight
- high corrosion protection
- short installation time

TECHNICAL PROPERTIES

STEEL

The steel used for the production of the UltraCor® structures conforms to the European Standards:

- EN 10025-2 "Hot-rolled products of structural steels – Part 2: Technical delivery conditions for non-alloy structural steels"
- EN 10149-2 "Hot-rolled flat products made of high-yield strength steels for cold forming – Part 2: Delivery conditions for thermomechanically rolled steels"

ULTRACOR® STEEL MECHANICAL PROPERTIES

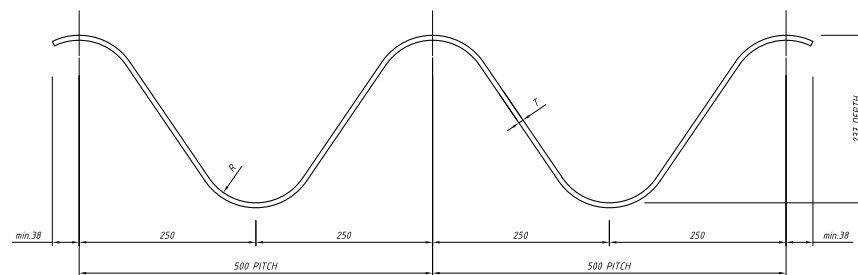
Steel grade	Standard	Minimum yield strength R_e [MPa]	Tensile strength R_m [MPa]
S355MC	EN-10149	355	430 - 550
S420MC	EN-10149	420	480 - 620
S500MC*	EN-10149	500	550 - 700

* - non-standard steel grade, used only for special design requirements

The steel is delivered with the certificate 3.1 acc. to EN 10204

CORRUGATION

The UltraCor® corrugation profile is 500 x 237 mm.



T – plate thickness [mm]

R – radius [mm] - (depends on the plate thickness).



MATERIAL PROPERTIES

MATERIAL PROPERTIES OF ULTRACOR PLATE

Plate thickness t [mm]	Yield stress [MPa]	Area [mm ² /mm]	Moment of inertia [mm ⁴ /mm]	Section modulus [mm ³ /mm]	Plastic section modulus [mm ³ /mm]
6,00	355 / 420 / 500	8.662	54849	451.43	607.80
7,00	355 / 420 / 500	10.110	64131	525.67	710.15
8,00	355 / 420 / 500	11.559	73457	599.65	812.81
9,00	355 / 420 / 500	13.009	82827	673.39	915.79
10,00	355 / 420 / 500	14.460	92243	746.91	1019.09
11,00	355 / 420 / 500	15.913	101706	820.21	1122.72
12,00	355 / 420 / 500	17.366	111217	893.31	1226.68



PLATES

UltraCor® structures can be produced from steel plates of standard thickness from 6.0 mm** up to 12.0 mm.

THE MAXIMUM LENGTH OF PLATE IS LIMITED BY PLATE THICKNESS AND STEEL GRADE:

Steel grade	Plate thickness	Number of U*
S355MC / S420MC	6mm**	4-12 U
	7mm	4-12 U
	8mm	4-12 U
	9mm	4-11 U
	10mm	4-10 U
	11mm	4-8 U
	12mm	4-6 U
S500MC	6mm**	4-12 U
	7mm	4-12 U
	8mm	4-8 U
	9mm	4-7 U
	10mm	4-6 U

THE MINIMUM RADIUS IS LIMITED BY PLATE THICKNESS:

Plate thickness	Min. radius [mm]
6mm**	5100
7mm	4000
8mm	3000
9mm	3000
10mm	3000
11mm	4000
12mm	4000

U* - circumferential hole spacing that depends on the configuration of bolting connection.

The standard value of "U" is 493mm.

** - should be agreed with the production department before sending offer/order.



Standard width module, plate dimensions, hole sizes, hole configurations and spacing are presented in the "Catalogue of Production Standard Solutions and Details" (available on request).



TOLERANCES OF STRUCTURE'S GEOMETRY

The values of the geometric parameters of the structure after assembly should not differ from the designed values more than:

- span + 2%
- rise +2% /-4% for box shapes, ± 2% for other shapes
- length + 0.5%

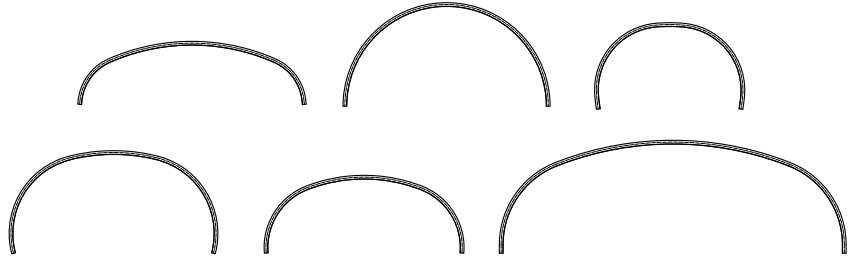
The vertical displacement of the structure's crown point during the backfilling process should not exceed 2% of its span measured before backfilling.

PRODUCTION TIME

Production time for each structure is calculated individually.

PROFILES

The shapes of UltraCor® structures are as follows:



The basic parameters of the profiles are presented in in TDS Appendix no.1. Custom shapes are available on request and have to be agreed with the producer.

BOLTS, NUTS, ANCHOR BOLTS

Type	Dimension	Length or thickness	Standard
Bolts	M22 (class 10.9)	60 mm, 80 mm	EN ISO 898-1
	M24 (class 10.9)	60 mm, 80 mm	EN ISO 898-1
Nuts	M22	-	EN ISO 898-2
	M24	-	EN ISO 898-2
Anchor bolts	M22	225 mm, 430 mm	EN 10025-2
Base channels	260 x 310 x 70 mm	7 or 10 mm - acc. to project	EN 10025-2

Bolts and nuts shall be galvanised in accordance with EN ISO 1461 and EN ISO 10684. They are delivered with the certificate 3.1 acc. to EN 10204. The type of bolts and base channel thickness are individually designed.

DURABILITY

The corrosion resistance of the steel is the main factor ensuring the durability of the structure.

Depending on environmental conditions (aggressivity), calculated durability may be longer than 100 years.

It can be ensured by:

- Zinc coating
- Paint coating
- Sacrificial thickness of the steel plate (increase of the plate thickness)



ZINC COATING

The structural plates are galvanised in accordance with EN ISO 1461. Table no.1 presents a feasible range of coating thicknesses. The bolts and nuts are galvanised in accordance with EN ISO 1461 and/or 10684. The zinc coat thickness is verified by means of a magnetic method in accordance with EN ISO 2178. Each structure is delivered with a certificate of galvanising.

EXTRA THICKNESSES OF ZINC COATING

Plate thickness [mm]	Thickness of zinc coating acc. to EN ISO 1461 [µm]	Extra thickness of zinc coating available on customer's demand as a standard [µm]										Extra thickness of zinc coating available on customer's demand by special conditions [µm]							
		70	85	75	80	85	90	95	100	105	110	115	120	125	130	135	140	145	150
		6,00	X	-	X	X	X	X	X	X	X	X	X	-	-	-	-	-	-
7,00	-	X	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	
8,00	-	X	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	
9,00	-	X	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	
10,00	-	X	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	
11,00	-	X	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	
12,00	-	X	-	-	-	X	X	X	X	X	X	X	X	X	X	X	X	X	

X

- available thickness of zinc coating

VIACOAT SYSTEM

The extension of durability of the UltraCor® structures (mainly necessary in aggressive environments) is achieved by applying additional corrosion protection – epoxy (EP), polyurethane (PUR) or other painting systems. Doubled protection of a structure (zinc coating and paint system) is called ViaCoat system. The minimum adhesion of the paint to the zinc base measured by pull-off method is 4 MPa. In order to obtain proper protection effect, paint coatings are applied in controlled conditions (closed area with defined temperature and humidity), keeping the technological regime.

The colour of the ViaCon standard painting system is RAL 1013 or RAL 7035. Each painted structure is always delivered a certificate of painting.

LOADS

UltraCor® structures can be used for every common class of road and rail traffic loads (according to the European Standard EN 1991-2 or others). The bearing capacity for other loads, e.g., airplanes, industrial or any other special loads can also be evaluated.

OTHER INFORMATION

Each application of a UltraCor® structure requires technical design, including estimated loads, hydrological conditions and other limiting factors. Appropriate rise and span of the cross section should be chosen.

The design should follow the guidelines issued by ViaCon as well as respective country-specific requirements. Foundations for corrugated steel structures with open shapes should be designed on an individual basis.

Rigid or flexible foundation could be applied. Dewatering systems should be designed on an individual basis.

LIST OF STANDARDS

EN ISO 898-1 – “Mechanical properties of fasteners made of carbon steel and alloy steel. Bolts, screws and studs with specified property classes. Coarse thread and fine pitch thread”.

EN ISO 1090-1 – “Execution of steel structures and aluminum structures. Requirements for conformity assessment of structural components”.

EN ISO 1461 – “Hot-dip galvanised coatings on fabricated iron and steel articles. Specifications and test methods”.

EN ISO 1991-2 – “Eurocode 1. Actions on structures – Part2: Traffic loads on bridges”.

EN ISO 2178 – “Non-magnetic coatings on magnetic substrates. Measurement of coating thickness. Magnetic method”.

EN 10025-2 - “Hot-rolled products of structural steels – Part 2: Technical delivery conditions for non-alloy structural steels”.

EN 10149-2 - “Designation hot-rolled flat products made of high yield strength steels for cold forming – Delivery conditions for thermo-mechanically rolled steels”.

EN 10204 – “Metallic products. Types of inspection documents”.

EN ISO 10684 – “Fasteners. Hot-dip galvanised coatings”.

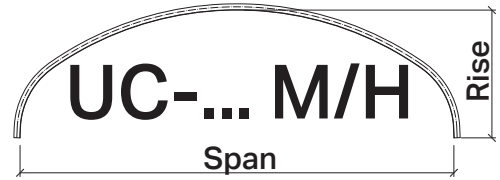
TRANSPORT & STORAGE

Unloading and placement of the structure’s elements should be performed with the use of light mechanical crane and textile belts. The structure’s elements should not be dropped from the transportation unit. Plates can be stored in stacks using wooden or carton spacers.

Any damages to the corrosion protection caused during transportation, unloading or assembly must be repaired in accordance with the “Assembly & Backfilling Guide”.

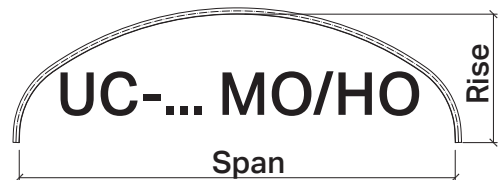


APPENDIX



VIACON ULTRACOR STRUCTURE - UC-...M & UC-...H STANDARD PROFILES - RMIN = 3000MM - APPLICABLE FOR PLATE THICKNESS 8,00MM; 9,00MM & 10,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-1M	14,45	3,89	45,05
UC-1H	14,11	4,23	47,07
UC-2M	15,27	3,93	46,78
UC-2H	15,06	4,55	52,56
UC-3M	16,08	4,32	55,13
UC-3H	16,17	4,90	63,44
UC-4M	17,14	4,41	59,60
UC-4H	17,25	5,08	68,80
UC-5M	17,99	4,40	61,08
UC-5H	18,20	5,31	75,08
UC-6M	19,14	4,80	70,47
UC-6H	19,06	5,28	76,77
UC-7M	20,06	4,94	75,80
UC-7H	20,14	5,88	91,74
UC-8M	20,89	5,14	82,04
UC-8H	20,93	6,10	98,82
UC-9M	22,10	5,44	92,05
UC-9H	22,08	6,44	110,18
UC-10M	22,93	5,64	98,89
UC-10H	22,87	6,65	117,91

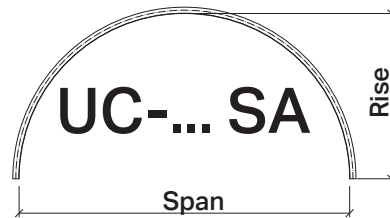


VIACON ULTRACOR STRUCTURE - UC-...MO & UC-...HO STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-1MO	14,39	4,01	46,09
UC-1HO	14,05	4,30	47,55
UC-2MO	15,23	4,22	51,03
UC-2HO	14,88	4,63	53,08
UC-3MO	15,82	4,49	56,85
UC-3HO	16,48	4,92	63,56
UC-4MO	17,05	4,51	60,75
UC-4HO	17,17	5,17	69,78
UC-5MO	18,07	4,67	65,78
UC-5HO	18,06	5,37	75,73
UC-6MO	18,98	4,87	71,42
UC-6HO	18,98	5,31	77,22
UC-7MO	20,05	5,23	81,37
UC-7HO	19,92	5,73	88,05

VIACON ULTRACOR STRUCTURE - UC-...MO & UC-...HO STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-8MO	20,74	5,21	83,21
UC-8HO	20,71	5,95	95,00
UC-9MO	21,82	5,56	93,83
UC-9HO	21,93	6,26	105,76
UC-10MO	22,71	5,72	100,29
UC-10HO	23,01	6,40	112,25

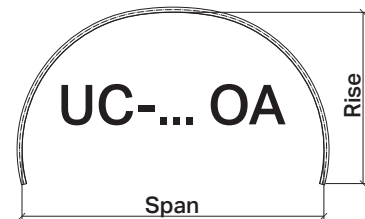


VIACON ULTRACOR STRUCTURE - UC- ...SA STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-1SA	13,05	6,52	66,86
UC-2SA	13,36	6,68	70,11
UC-3SA	13,68	6,84	73,45
UC-4SA	13,99	7,00	76,86
UC-5SA	14,30	7,15	80,34
UC-6SA	14,62	7,31	83,91
UC-7SA	14,93	7,47	87,55
UC-8SA	15,24	7,62	91,27
UC-9SA	15,56	7,78	95,07
UC-10SA	15,87	7,94	98,94
UC-11SA	16,19	8,09	102,90
UC-12SA	16,50	8,25	106,92
UC-13SA	16,81	8,41	111,03
UC-14SA	17,13	8,56	115,21
UC-15SA	17,44	8,72	119,47
UC-16SA	17,76	8,88	123,81
UC-17SA	18,07	9,03	128,22
UC-18SA	18,38	9,19	132,72
UC-19SA	18,70	9,35	137,29
UC-20SA	19,01	9,51	141,93
UC-21SA	19,32	9,66	146,66
UC-22SA	19,64	9,82	151,46
UC-23SA	19,95	9,98	156,34
UC-24SA	20,27	10,13	161,30
UC-25SA	20,58	10,29	166,33
UC-26SA	20,89	10,45	171,44
UC-27SA	21,21	10,60	176,63
UC-28SA	21,52	10,76	181,90
UC-29SA	21,84	10,92	187,24
UC-30SA	22,15	11,07	192,67

VIACON ULTRACOR STRUCTURE - UC- ...SA STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-31SA	22,46	11,23	198,16
UC-32SA	22,78	11,39	203,74
UC-33SA	23,09	11,55	209,39
UC-34SA	23,40	11,70	215,12
UC-35SA	23,72	11,86	220,93
UC-36SA	24,03	12,02	226,82
UC-37SA	24,35	12,17	232,78
UC-38SA	24,66	12,33	238,85

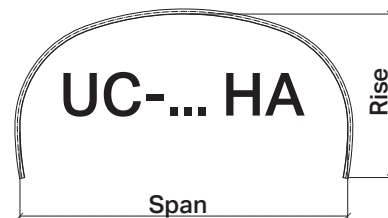


VIACON ULTRACOR STRUCTURE - UC- ...OA STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-10A	12,60	5,81	62,09
UC-20A	12,72	6,31	68,36
UC-30A	12,61	7,00	74,75
UC-40A	12,97	5,96	65,54
UC-50A	13,09	6,45	71,71
UC-60A	13,02	7,33	81,21
UC-70A	13,38	6,14	68,91
UC-80A	13,15	6,43	71,84
UC-90A	13,34	7,57	85,29
UC-100A	13,40	6,23	71,38
UC-110A	13,42	6,61	75,31
UC-120A	13,32	7,48	84,77
UC-130A	13,73	6,27	73,96
UC-140A	13,80	6,84	79,22
UC-150A	13,72	7,73	89,44
UC-160A	14,10	6,49	78,07
UC-170A	14,20	7,05	85,31
UC-180A	14,31	8,01	96,61
UC-190A	14,37	6,68	81,65
UC-200A	14,30	7,02	85,40
UC-210A	14,53	8,24	100,28
UC-220A	14,79	6,82	85,58
UC-230A	14,64	7,21	89,42
UC-240A	14,85	8,31	104,25
UC-250A	14,83	6,84	85,36
UC-260A	14,98	7,45	93,58
UC-270A	14,96	8,48	107,61
UC-280A	15,24	7,02	89,76

VIACON ULTRACOR STRUCTURE - UC- ...OA STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-290A	15,38	7,57	97,48
UC-300A	15,25	8,65	111,73
UC-310A	16,81	9,68	137,61
UC-320A	16,36	7,69	105,35
UC-330A	17,20	8,18	117,84
UC-340A	17,85	10,37	156,35
UC-350A	18,89	11,06	176,28
UC-360A	18,33	8,85	135,56
UC-370A	19,17	9,35	149,65
UC-380A	19,93	11,74	197,39
UC-390A	20,97	12,43	219,70
UC-400A	20,29	10,01	169,51
UC-410A	22,00	13,11	243,18
UC-420A	21,42	10,68	190,60
UC-430A	22,26	11,18	207,21
UC-440A	23,04	13,80	267,86
UC-450A	24,08	14,49	293,73
UC-460A	23,38	11,84	230,04
UC-470A	25,37	15,35	327,73
UC-480A	24,50	12,51	254,87
UC-490A	26,41	16,03	356,28
UC-500A	25,35	13,01	274,00

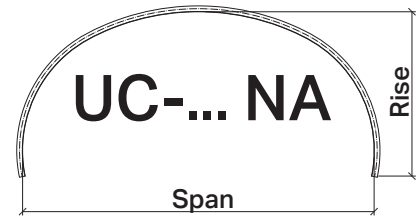


VIACON ULTRACOR STRUCTURE - UC- ...HA STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-1HA	9,33	5,38	42,53
UC-2HA	10,17	5,49	47,80
UC-3HA	11,27	6,03	58,78
UC-4HA	12,13	6,20	64,90
UC-5HA	13,23	6,60	74,82
UC-6HA	14,14	7,10	85,47
UC-7HA	15,02	7,36	93,09
UC-8HA	16,03	8,00	111,54
UC-9HA	16,94	8,45	124,12
UC-10HA	17,91	9,15	141,80
UC-11HA	19,06	9,60	156,81
UC-12HA	20,02	10,36	177,12
UC-13HA	20,94	10,88	193,50

VIACON ULTRACOR STRUCTURE - UC- ...HA STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-14HA	21,91	11,31	214,49
UC-15HA	22,83	11,79	232,58
UC-16HA	24,02	12,48	257,64
UC-17HA	24,94	12,98	277,15

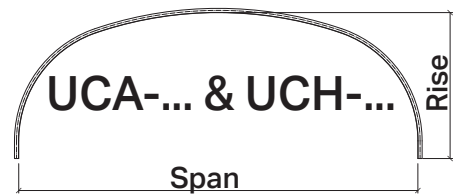


VIACON ULTRACOR STRUCTURE - UC- ...NA STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-1NA	12,58	4,82	50,00
UC-2NA	13,08	5,94	65,29
UC-3NA	13,50	4,79	52,12
UC-4NA	13,74	5,18	58,26
UC-5NA	14,00	6,54	75,93
UC-6NA	14,50	5,21	60,78
UC-7NA	15,04	5,32	63,60
UC-8NA	14,92	6,97	86,20
UC-9NA	15,19	5,77	70,66
UC-10NA	15,83	5,20	68,13
UC-11NA	15,96	6,65	88,98
UC-12NA	15,79	5,48	72,05
UC-13NA	16,76	5,40	74,10
UC-14NA	17,07	6,76	95,90
UC-15NA	17,08	5,57	77,61
UC-16NA	17,51	5,68	80,84
UC-17NA	17,93	6,96	103,19
UC-18NA	17,89	5,81	84,23
UC-19NA	19,01	5,97	90,53
UC-20NA	19,04	7,12	110,62
UC-21NA	19,41	6,12	94,23
UC-22NA	19,64	6,31	98,45
UC-23NA	19,90	7,37	118,61
UC-24NA	20,32	6,39	101,68
UC-25NA	20,64	6,79	110,70
UC-26NA	20,91	8,41	141,87
UC-27NA	21,07	6,95	114,87
UC-28NA	21,85	6,12	108,13
UC-29NA	21,89	8,19	149,67
UC-30NA	22,35	6,22	111,85
UC-31NA	22,87	6,87	127,21
UC-32NA	22,98	8,90	170,28

VIACON ULTRACOR STRUCTURE - UC- ...NA STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UC-33NA	23,41	6,96	131,09
UC-34NA	24,01	7,28	140,57
UC-35NA	24,08	9,05	179,70
UC-36NA	24,57	7,38	144,68
UC-37NA	25,12	7,48	148,86
UC-38NA	24,95	9,26	189,66
UC-39NA	25,43	7,64	153,79
UC-40NA	26,00	7,97	164,42
UC-41NA	27,20	8,63	186,58
UC-42NA	28,02	9,12	204,01
UC-43NA	29,17	9,78	228,32
UC-44NA	30,03	10,28	247,37
UC-45NA	30,89	10,77	267,11
UC-46NA	32,05	11,42	294,49



VIACON ULTRACOR STRUCTURE - UC- ...NA STANDARD PROFILES - RMIN = 4000MM - APPLICABLE FOR PLATE THICKNESS 6,0MM; 7,0MM; 8,00MM; 9,00MM; 10,00MM; 11,00MM & 12,00MM

Name	Span - inner [m]	Rise - inner [m]	Area [m ²]
UCA-1	23,41	8,56	168,60
UCA-2	28,51	9,79	225,67
UCH-1	22,19	7,13	131,09
UCH-2	25,68	8,05	167,21
UCH-3	28,91	8,69	205,40











VIACON

Constructing connections.
Consciously.