SIMONA

SIMONA® Twin-Wall Sheets

Light, quiet, strong and versatile

SIMONA® Twin-Wall Sheets –
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SIMONA® Twin-Wall Sheets are highly innovative and versatile. Twin-wall sheets are made of PE 100, PP-DWU AlphaPlus® (PP-H), PPs or PP-C-UV sheets with state-of-the-art machine technology. They combine high rigidity, low specific weight and good thermal insulation with the benefits of efficient fabrication and machining.

Twin-wall sheets can be processed by the same methods as those used for solid materials. We can now offer you an optimised second generation of SIMONA® Twin-Wall Sheets.

Properties of SIMONA® Twin-Wall Sheets

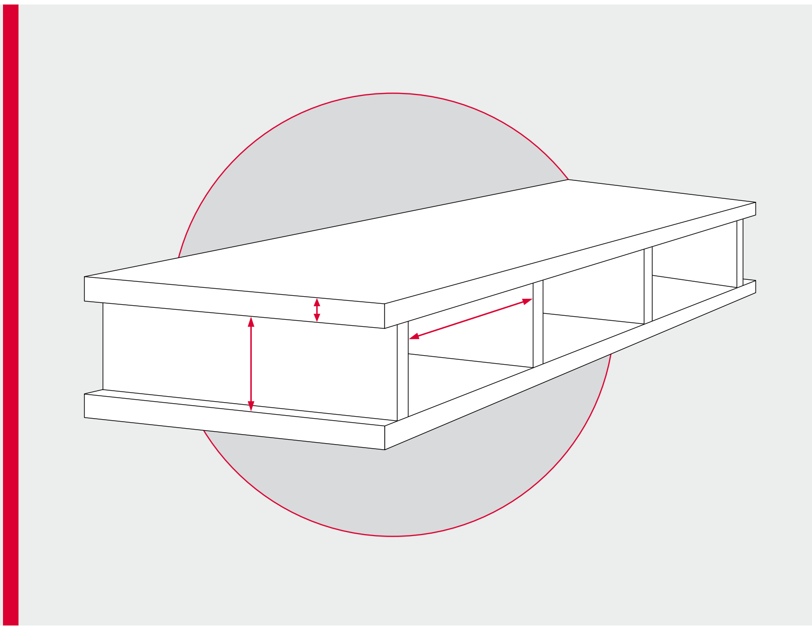
- Higher physical strength due to variable web spacing (54 mm and 108 mm)
- Construction of larger tanks (volumes 5 m^3 and more) possible without steel reinforcement
- Customised sheet thickness (from 5 mm to 10 mm)
- Variable number of webs depending on requirements (10 or 19)

Design-specific advantages

- Rectangular tanks possible without steel reinforcement
- Lighter weight than solid material due to cavities
- Excellent sound insulation (DIN ISO 140-3 certificates available on request)
- High rigidity and strength
- High break resistance
- Many different fields of application
- Support with structural analysis possible

Plastic-specific advantages

- High thermal insulation
- Good electrical insulation
- Good slip properties
- High wear resistance
- High chemical resistance
- Low water absorption
- Resistant to microorganisms
- Excellent fabrication capability



Advantages of PE 100

- Impact strength down to –50 °C
- Insensitive to weather
- High chemical resistance

Advantages of PP-DWU AlphaPlus®

- Service temperature range up to +100 °C
- High chemical resistance

Advantages of PPs

- Low flammability in accordance with DIN 4102 B1

At a glance

- Variable number of webs
- Variable sheet thickness
- Excellent fabrication properties
- High rigidity despite light weight
- Wide range of potential applications
- Support with structural analysis from LGA, Nuremberg, available on request

Certificates

- DIN ISO 140-3: Sound insulation of PE-HKP with and without mineral filling
- DIN 4102 B1: PPs-HKP low flammability
- DIN 4102: PE-HKP, PP-HKP normal flammability

SIMONA® Twin-Wall Sheets –
An unlimited number of potential applications



Construction industry

- Slide and anti-wear sheets in conjunction with thermal insulation
- Walk-over swimming pool floors
- Lightweight shaft bottoms or concrete-lined for floats
- Shafts
- Protective ducts for pipelines and supply lines
- Stone impact protection in road construction
- Sound barriers with and without infill panels
- Safety floor sheets
- Ventilation ducts

Apparatus, equipment, machines

- Rectangular tanks
- Covers for electroplating baths, structurally strong and thermally insulating
- Boat construction
- Floating pontoons for pipe-lines and supply lines at sea
- Storm-water retention basins
- Cooling water tanks
- Refrigerating containers
- Ice boxes
- Sound booths
- Spray booths
- Weather booths
- Safety tanks
- Water supply tanks

From left to right: overflow tank, jet scrubber, partition, swimming pool floor, water buffer

Bottom left: spray booth

Bottom right: flow distributor for ventilation ducts

Agriculture

- Linings for transport stalls
- Linings for silos
- Medicinal baths for horses
- Partitions

Environment

- Biofilters
- Wastewater engineering
- Sewage sludge treatment
- Flood protection structures

Automotive industry

- Internal linings for lorry cargo spaces (thermal insulation, stone protection)

Miscellaneous

- Alternative product to aluminium twin-wall profiles

SIMONA® Twin-Wall Sheets –
Product range, material specifications, corner elements

SIMONA® PE-HKP
PE 100 is a high-heat resistant, UV-stabilised polyethylene.

SIMONA® PP-HKP
PP-DWU AlphaPlus® (PP-H) is a homopolymer, alpha-nucleated, permanent-heat-resistant polypropylene.

SIMONA® PPs-HKP
PPs is a low-flammability, homopolymer, permanent-heat-resistant polypropylene.

SIMONA® PP-C-UV-HKP
PP-C-UV is a copolymer, UV-stabilised polypropylene.

Range of Products

PE-HKP, black

Height mm	Web height mm	3000 x 1000 kg/piece	Web spacing mm	Number of webs piece	Material thickness mm
54	41	43.2	108	10	6
54	41	51.0	54	19	6
58	41	62.4	54	19	8

PP-HKP, grey

54	41	41.4	108	10	6
54	41	49.0	54	19	6
58	41	59.8	54	19	8

PPs-HKP, grey

54	41	43.2	108	10	6

PP-C-UV-HKP, blue (top)/grey (bottom)

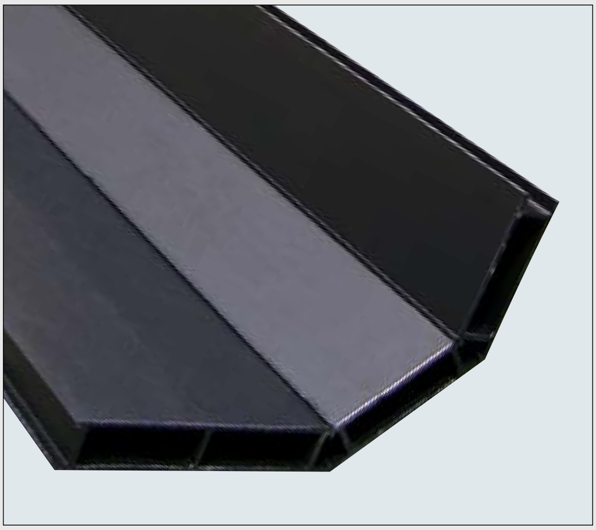
Available on request

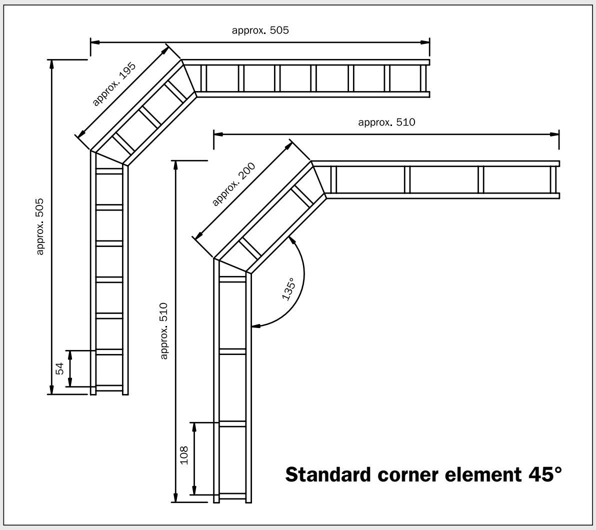
Material specifications (standard sheets)

	PE-HKP	PP-HKP	PPs-HKP
Density, g/cm³ (basic sheet)	0.960	0.915	0.950
Impact strength at –40 °C	No break	No break	No break
Service temperature range, °C	–50 to +80	0 to +100	0 to +100
Fire behaviour DIN 4102 (basic sheet)	Normal flammability	Normal flammability	Low flammability B1

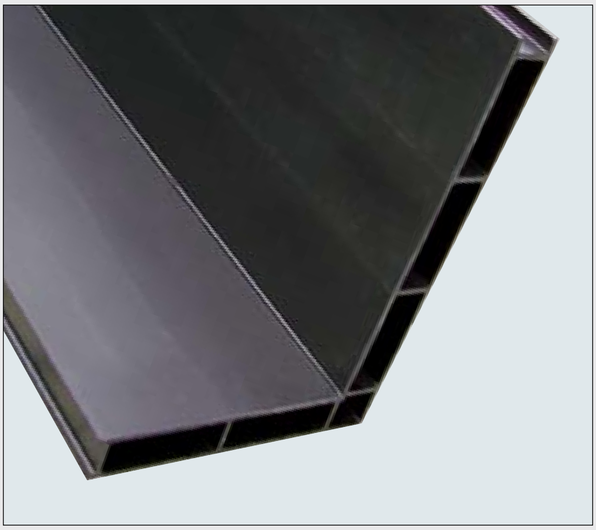
TECHNICAL SUPPORT
+49 (0) 67 52 14-587
tsc@simona.de

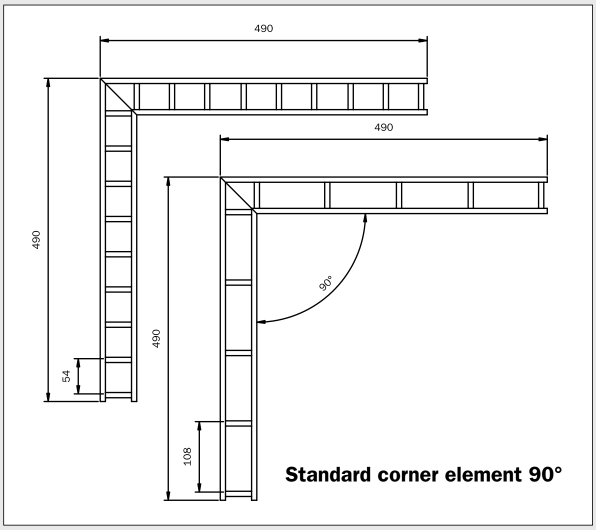
Corner elements





Standard corner element 45°





Standard corner element 90°

Corner elements in angles 45° and 90° are made of the materials PE 100, PP-DWU AlphaPlus® and PPs and are available on request.

SIMONA® Twin-Wall Sheets – Diverse processing capabilities

Welding

General

Pipe parts and sheets with an MFR (MFR = melt mass flow rate) of 0.3 to 1.7 and 0.2 to 0.7 can be welded to one another. This means that the fusion properties when warmed are very similar. This statement is contained in DVS 2207 Part 1 and has also been confirmed by DVGW (German Gas and Water Association). For PP-H (Type 1), PP-B (Type 2) and PP-R (Type 3) the weldability is within melt index group 006/012 (MFR 190/5: 0.4 to 1.0 g/10 min.). This statement can be found in DVS 2207 Part 11.

Welding preparation

Directly before welding the surfaces to be connected, the adjacent areas and any damaged surfaces (especially if there are weather or chemical influences) must be machined down to intact zones.

Hot-gas string bead welding

For twin-wall sheets which can only be welded from one side it is advisable to use a single V. Cleaning of surfaces to be welded to sheet and wire by machining is essential. Welding with the tacking nozzle serves to keep the parts in position. Fusion is performed with hot air but without any additional wire.

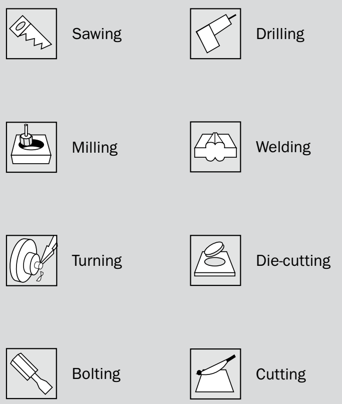
Weld structure

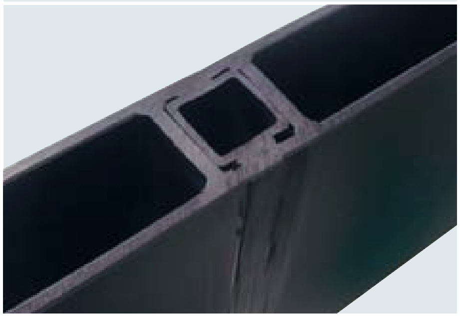
Thickness mm	Number x diameter mm
5	6 x 3
6	6 x 4

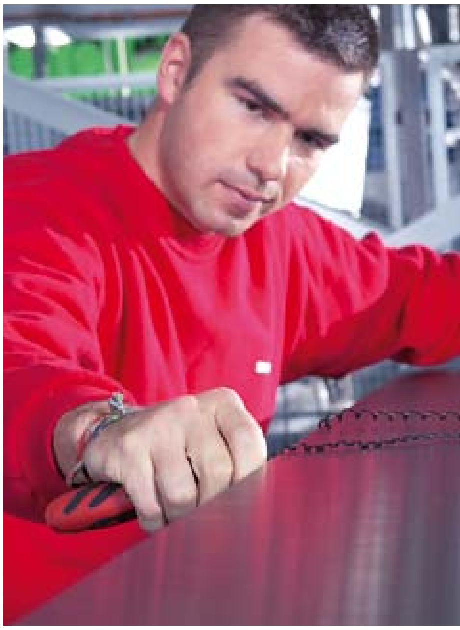
For a sheet thickness of 8 mm we recommend extrusion welding

Extrusion welding

Suitable fillings (e.g. a PE-HWU solid sheet 40 mm thick or a square profile) must be introduced to the cavity in the seam area of the twin-wall sheets in order to ensure a build-up of pressure in the seam zone. An airtight seam 4 mm thick is to recommended.







Material	Temperature of extrudate measured at the nozzle outlet °C	Air temperature measured in the hot air nozzle °C	Air flow (cold air intake) l/min
PE-HKP	210 to 230	250 to 300	≥ 300
PP-HKP	210 to 240	250 to 300	≥ 300

Hot plate welding

Welding seam preparation

The cleanliness of the parts to be joined by welding and of the hot plate itself is of paramount importance in hot plate welding. Teflon films or coatings facilitate the cleaning of heating surfaces and prevent plastics from clinging to the hot plate when warming up.

Hot plate temperature

Semi-finished products with a large wall thickness usually call for relatively low temperatures – within tolerances – and a suitably longer exposure time. A heated tool height of at least 70 mm and a clamping distance of 60 mm are to be recommended for twin-wall sheets 54 mm to 60 mm thick because a relatively uniform temperature distribution can be guaranteed. A hot plate temperature of 210 °C to 220 °C for PE and PP and the pressures and times commensurate with the aggregate wall thicknesses are to be recommended.

Machining

SIMONA® Twin-Wall Sheets can be processed by many different methods. These include drilling, milling, turning and sawing; in this case, a distinction must be made between circular sawing and band-sawing.

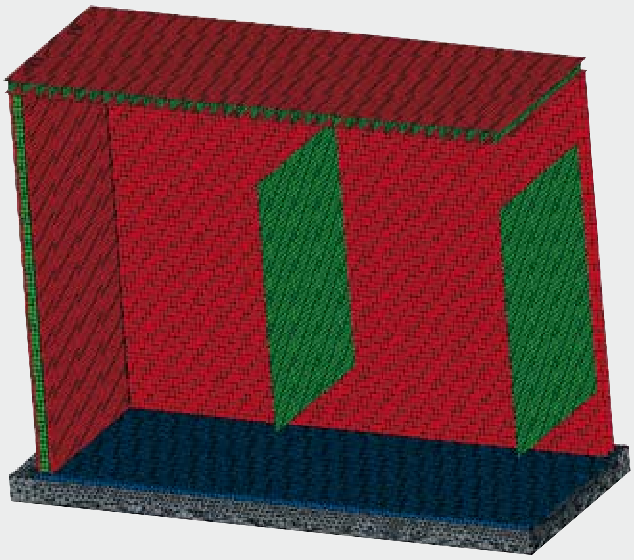
Further information

For further information, please refer to our prod.info "Twin-Wall Sheets".

Structural analyses using FEM (Finite Element Method) – An example

Storage tank made of PE twin-wall sheets (PE-HKP) with an 8 mm outer skin, 19 webs and a format of 4000 x 1500 x 1500 mm for a liquid level of 1400 mm

TÜVRheinland®
LGA
Statisch geprüft
BBIS 69602593
Behälter aus Hohlkammerplatten



Positioned vertically, the webs provide the structure with the necessary strength. The partitions welded into the tank serve as ties and bring about a reduction in the deformation which would result when filled with water at a temperature of 25 °C. Consequently, the tank can be built without any steel reinforcement whatsoever. The base is made of a 20 mm PE sheet and easily withstands the pressure exerted by the water. Like the tank wall, the cover is made of PE-HKP.

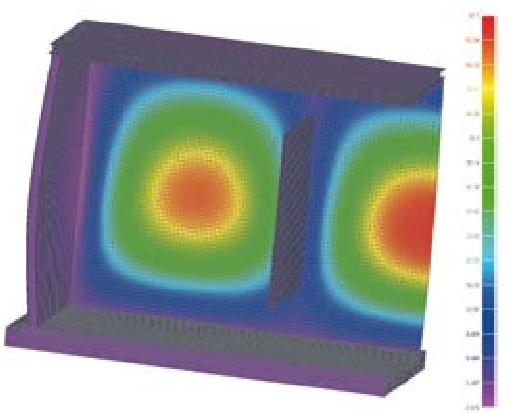
The colour plots show the averaged stresses and the deformation occurring, thereby illustrating the overall load capacity of the tank. It is evident that the stresses are all within the acceptable range and do not exceed a maximum figure of 6 MPa. In addition, the stresses at the corner points and within the twin-wall sheet are mainly within the non-critical pressure range.

Deformation also remains at a maximum of 57 mm, so it is well below the maximum deformation of 5 % in relation to the free length of the span, which in this case is 75 mm. For deformation and stress results, please refer to page 11.

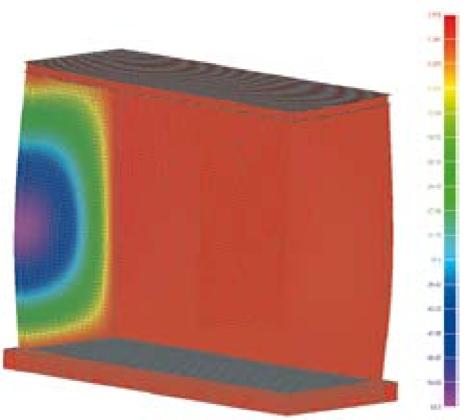
LGA Bautechnik GmbH, Nuremberg, supports SIMONA AG with FEM analyses (Finite Element Method).

Deformation results

Deformation of long side
(maximum bowing f = 3.8 %)

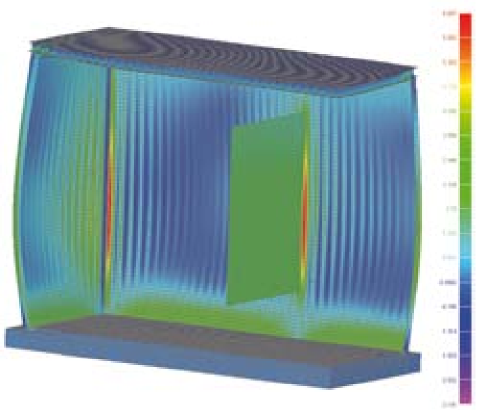


Deformation of end
(maximum bowing f = 3.8 %)

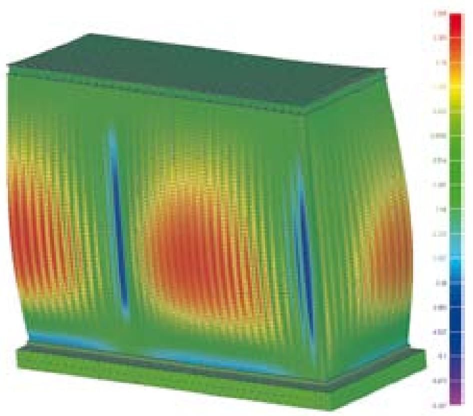


Stress results (assuming double the useful load)

Maximum tensile stress
(maximum stress = 6.6 MPa)



Maximum compressive stress
(maximum stress = 2.9 MPa)



Many different fabrication capabilities for an unlimited range of potential applications

In specific cases please contact our Technical Service Centre:

Phone +49 (0) 67 52 14-587, Fax +49 (0) 67 52 14-302, tsc@simona.de

Further information: www.simona-twin-wall-sheets.com

SIMONA worldwide

SIMONA AG

Teichweg 16
D-55606 Kirn
Germany
Phone +49 (0) 67 52 14-0
Fax +49 (0) 67 52 14-211
mail@simona.de
www.simona.de

PRODUCTION SITES

Plant I/II
Teichweg 16
D-55606 Kirn
Germany
Phone +49 (0) 67 52 14-0
Fax +49 (0) 67 52 14-211

Plant III
Gewerbestraße 1–2
D-77975 Ringsheim
Germany
Phone +49 (0) 78 22 436-0
Fax +49 (0) 78 22 436-124

SIMONA Plast-Technik s.r.o.
U Autodílen 23
CZ-43603 Litvínov-Chudeřín
Czech Republic

SIMONA AMERICA Inc.
64 N. Conahan Drive
Hazleton, PA 18201
USA

SIMONA ENGINEERING PLASTICS (Guangdong) Co. Ltd.
No. 368 Jinou Road
High & New Technology Industrial Development Zone
Jiangmen, Guangdong
China 529000

SALES OFFICES

SIMONA S.A. Paris
Z.I. 1, rue du Plant Loger
F-95335 Domont Cedex
Phone +33 (0) 1 39 35 49 49
Fax +33 (0) 1 39 91 05 58
domont@simona-fr.com

SIMONA UK LIMITED
Telford Drive
Brookmead Industrial Park
GB-Stafford ST16 3ST
Phone +44 (0) 1785 22 24 44
Fax +44 (0) 1785 22 20 80
mail@simona-uk.com

SIMONA AG SCHWEIZ
Industriezone
Bäumlimattstraße 16
CH-4313 Möhlin
Phone +41 (0) 61 8 55 90 70
Fax +41 (0) 61 8 55 90 75
mail@simona-ch.com

SIMONA S.r.l. ITALIA
Via Padana Superiore 19/B
I-20090 Vimodrone (MI)
Phone +39 02 25 08 51
Fax +39 02 25 08 520
mail@simona-it.com

SIMONA IBERICA SEMIELABORADOS S.L.
Doctor Josep Castells, 26–30
Polígono Industrial Fonollar
E-08830 Sant Boi de Llobregat
Phone +34 93 635 41 03
Fax +34 93 630 88 90
mail@simona-es.com
www.simona-es.com

SIMONA-PLASTICS CZ, s.r.o.
Zděbradská ul. 70
CZ-25101 Říčany-Jažlovice
Phone +420 323 63 78 3-7/-8/-9
Fax +420 323 63 78 48
mail@simona-cz.com
www.simona-cz.com

SIMONA POLSKA Sp. z o. o.
ul. H. Kamieńskiego 201–219
PL-51-126 Wrocław
Phone +48 (0) 71 3 52 80 20
Fax +48 (0) 71 3 52 81 40
biuro@simona.pl
www.simona.pl

SIMONA FAR EAST LIMITED
Room 501, 5/F
CCT Telecom Building
11 Wo Shing Street
Fo Tan
Hongkong
Phone +852 29 47 01 93
Fax +852 29 47 01 98
sales@simona.com.hk

SIMONA ENGINEERING PLASTICS TRADING (Shanghai) Co. Ltd.
Room C, 19/F, Block A
Jia Fa Mansion
129 Da Tian Road, Jing An District
Shanghai
China 200041
Phone +86 21 6267 0881
Fax +86 21 6267 0885
shanghai@simona.com.cn

SIMONA AMERICA Inc.
64 N. Conahan Drive
Hazleton, PA 18201
USA
Phone +1 866 501 2992
Fax +1 800 522 4857
mail@simona-america.com
www.simona-america.com

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