



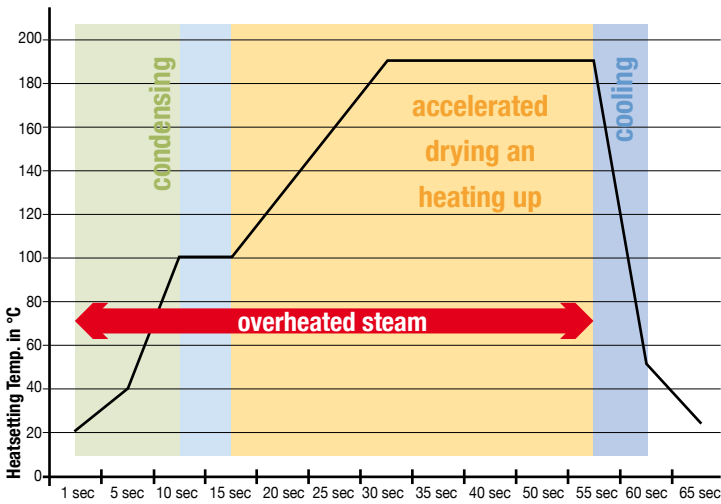
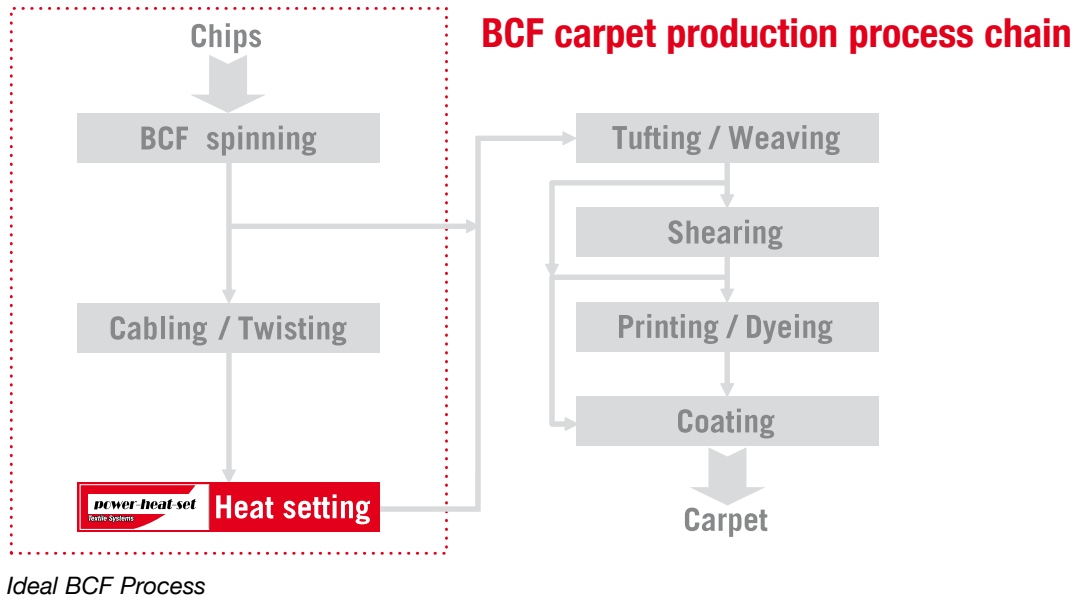
***power-heat-set***

*Textile Systems*

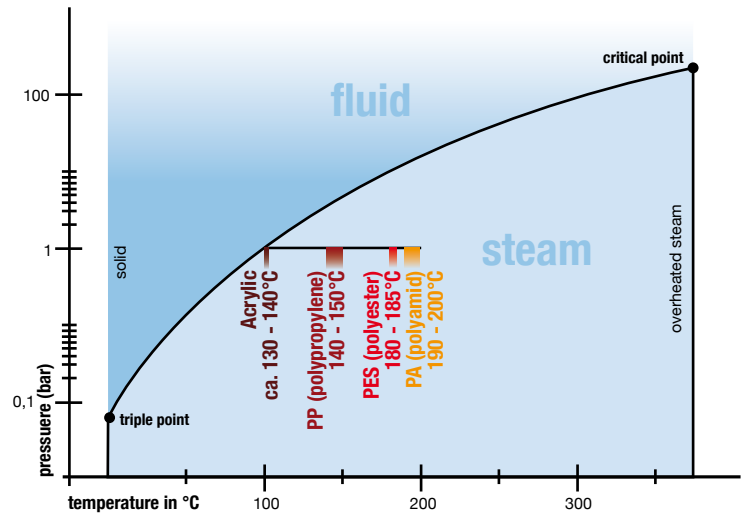
**Heat-Setting for Carpet Yarn  
- Overheated Steam -**

**New Generation – GVA  
5009 eco up to 72 ends**

**+++ more production +++ less energy consumption**



Overheated Steam



Curve of boiling Point (Water Vapour)

**Overheated Steam** emerges from saturated steam, which is further heated under constant pressure. Overheated steam is not saturated any more.

Steam heated to a temperature higher than the boiling point corresponding to its pressure. It can not exist in contact with water, nor contain water, and resembles a perfect gas; called also surcharged steam, anhydrous steam and steam gas and sometimes also applied to dry steam.

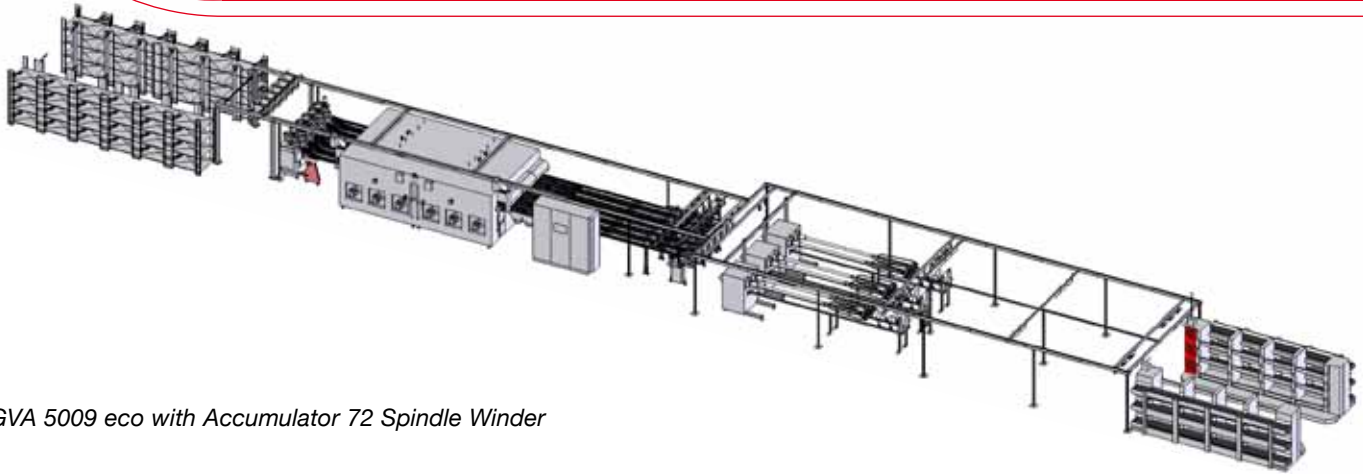
The process itself was revolutionary in that it was the first, system not operated with saturated steam and pressure, but with a superheated steam/air-mix at atmospheric pressure. Using this innovative technology, completely new carpet collections were created. In the Power-Heat-Set process, the yarns and filaments oxidize slightly on the surface due to the existing oxygen in the surrounding atmosphere and the higher temperatures. This ca-

pillary oxide film causes the complete carpet later to be more stain resistant. Dirt particles adhere less to the fibers.

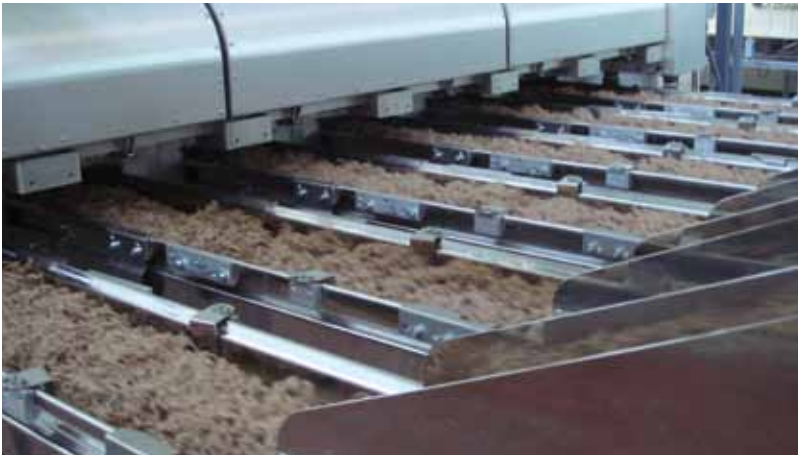
**Not against each other, but with each other and equally in rights (example for PA)**

overheated steam	saturated steam
› less shrinkage	› more shrinkage
› more bulk	› less bulk
› no moisture expansion	› strong moisture expansion
› resistance against stain, microbes, fungi, protoplasm, fats, wax, etc. (PA )	› less resistance against stain (Pa)
› diffuse definition	› precise definition (pinpoint)
› good covering	› less covering
› accelerated drying	› no drying
› slower heat transfer	› fast heat transfer





GVA 5009 eco with Accumulator 72 Spindle Winder



Frieze Production



Frieze, Solution dyed PA straight and white PA straight

### The Standard for the Continuous Heat-Setting of Carpet Yarn with Overheated-Heated Steam

The GVA yarn conditioning machine is predominantly used for the continuous heat-setting of twisted or cabled synthetic yarns in natural or dyed condition. This process heat-sets the twist in the yarn and bulks it at the same time. The machine is therefore mainly used for yarns intended for cut pile carpets (Saxony Carpets). More than 1.000 GVAs have already been supplied to major carpet yarn manufacturers on 5 continents. The GVA eco is ideal for heat-setting BCF and staple fibres. All common synthetic fibres like nylon, polyester, acrylic and polypropylene, as well as blends and wool, can be processed.

Bulking and heat-setting take place in a single process in the climate chamber under atmospheric pressure using super-heated steam. The GVA system guarantees maximum bulk, leading to savings of up to 8 to 10% in pile yarn requirements. With a maximum of 12 ends per working position, the machine is easy to operate and attains an efficiency of more than 95%.

#### Multi-Ends

With the appropriate winding set-up, the GVA eco can run with 4, 6, 8, 10 or 12 ends per belt or up to 24, 36, 48, 60 or 72 ends per machine.

#### Chamber Dwell Time

The first significant factor in determining the quality of the processed yarn is the chamber dwell time. Together with control of temperature and humidity, precise control of the time the yarn is in the heat-setting chamber assures consistent heat-setting and bulking. Most yarns are run with a dwell time near 60 seconds. The GVA eco needs a reduced dwell time. According to yarn quality the dwell time may be reduced to 45 s.

**Chamber Temperature** The second important parameter is the chamber temperature. This temperature depends on the type of yarn being processed:

Nylon 6.6	200°C – 212°C
Nylon 6	185°C – 202°C
Polyester	185°C
Polypropylen	140°C - 150°C
Acryl	130°C - 140°C
Wool	120°C

**Dewpoint Temperature** The dewpoint temperature inside the climate chamber is the third significant factor influencing the bulking and heat-setting process:

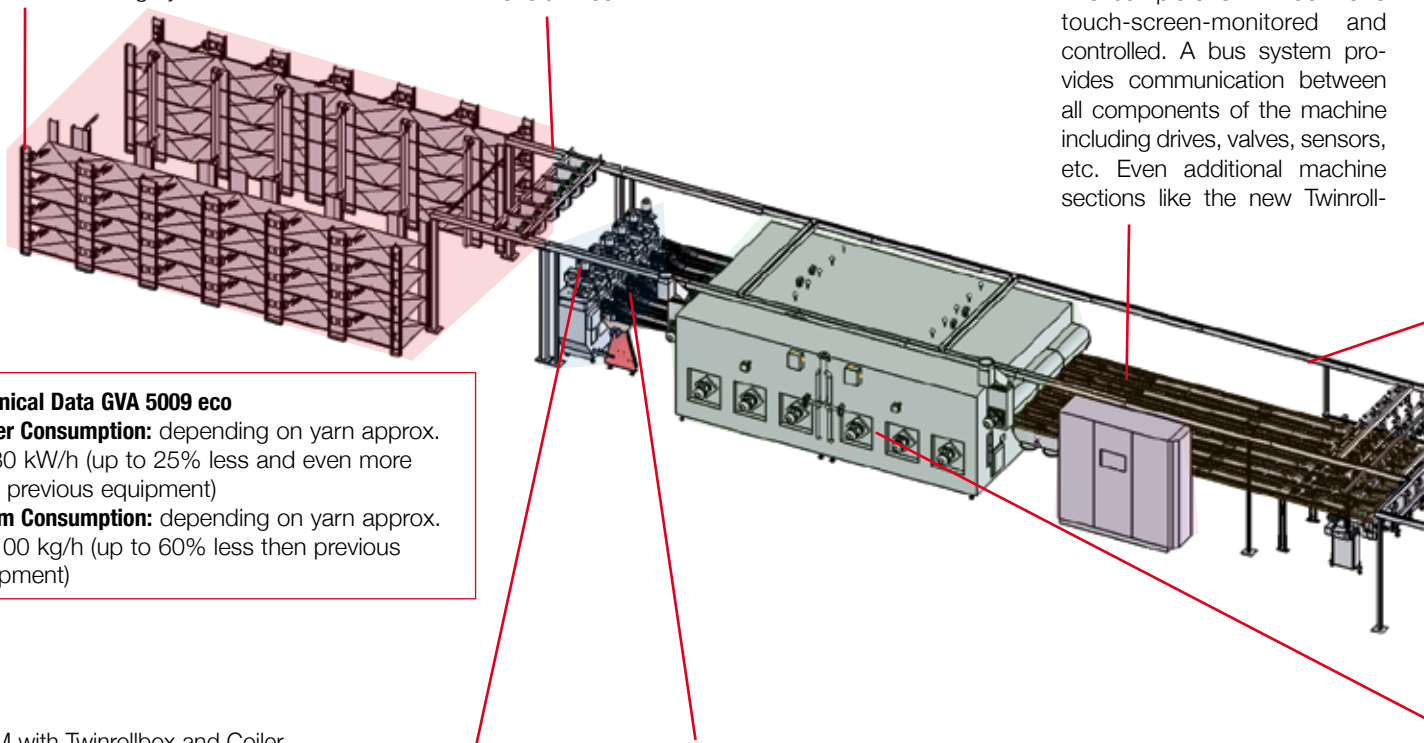
Polypropylen	88°C
Nylon 6.0; 6.6	88°C - 96°C
Polyester	90°C
Acryl	94°C - 96°C
Wool	92°C - 96°C



1. Creel for 24, 36, 48, 60 or 72 ends with new
  - ✓ mandrel for spare bobbins
  - ✓ extended yarn path
  - ✓ bobbin monitoring system

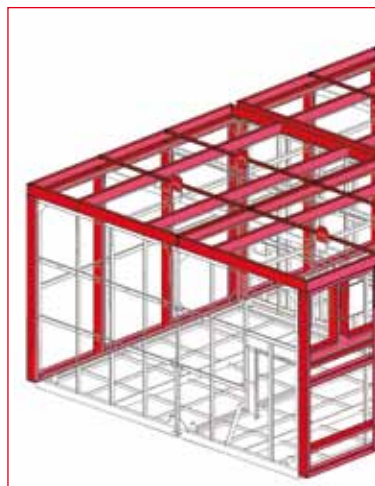
2. New single Capstan Rollers: The tension is controlled by variable speed overfeed rollers, the so called capstan rollers, which supply the yarn virtually tension free.

5. CoMoSys (Control And Monitoring System) designed for GVA heat-setting machines. The complete GVA machine is touch-screen-monitored and controlled. A bus system provides communication between all components of the machine including drives, valves, sensors, etc. Even additional machine sections like the new Twinroll-



**Technical Data GVA 5009 eco**  
**Power Consumption:** depending on yarn approx. 60-80 kW/h (up to 25% less and even more then previous equipment)  
**Steam Consumption:** depending on yarn approx. 60-100 kg/h (up to 60% less then previous equipment)

3. GSM with Twinrollbox and Coiler  
**FRIEZE YARN:** The GVA consists of 6 single-driven Twinrollboxes with individual adjustment of the friezing rate, allowing the yarn plant to produce a variety of textures at the highest level of quality, especially BCF yarn. The TRB produces all types of frieze with every kind of yarn with maximum speed of over 600 m/min for 12 ends per position (channel). It is possible to mix production of frieze and straight yarn, even different colors at the same time on one machine.  
**STRAIGHT YARN:** New Quick-Change capability to change between frieze and straight yarn production within a very short time (2 minutes/position).



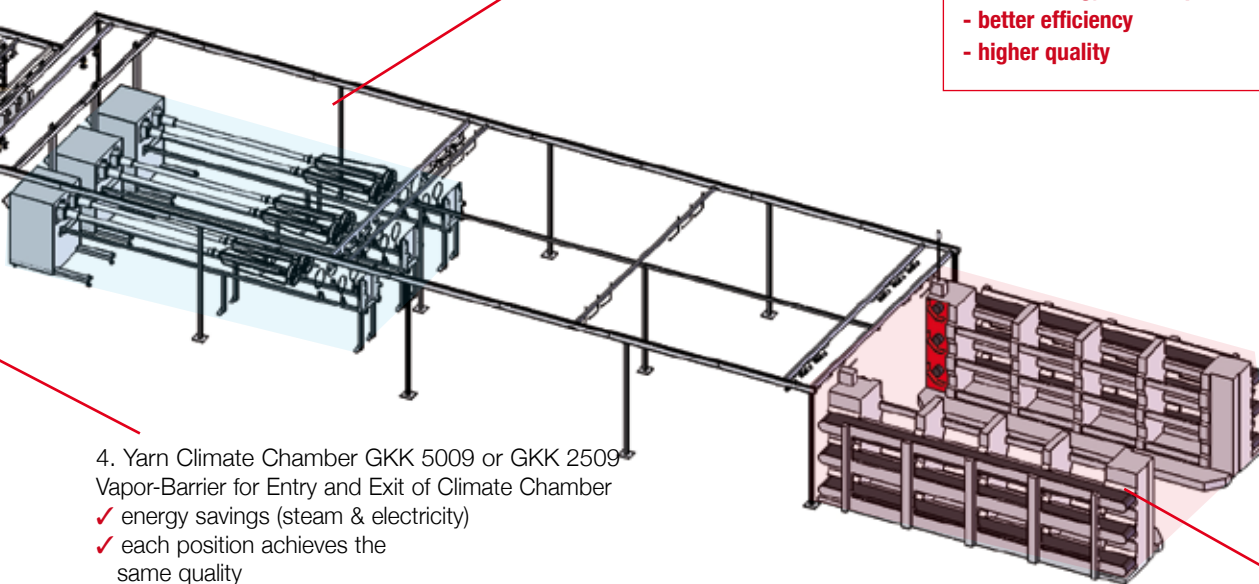




box for frieze yarn or the coiler for straight set yarn can be operated via the "Comosys". The intuitive operator interface screen facilitates the operation of the machine. Any alarm condition will automatically open a program displaying graphics that describe how to resolve the problem. NEW: Winder can be integrated in Comosys.

6. Belt Transport System with cooling section  
The 6 yarn transport belts of the transport unit are driven through a gear motor. The operating speed is infinitely variable by means of an inverter and can be set between 0 and 10 m/min.

7. Accumulator  
After heat-setting the yarn is pulled off the conveyor and is accumulated on the accumulator. After the accumulator, the ends are separated and wound on separate cones on the winder.



4. Yarn Climate Chamber GKK 5009 or GKK 2509  
Vapor-Barrier for Entry and Exit of Climate Chamber  
✓ energy savings (steam & electricity)  
✓ each position achieves the same quality

Many new developments were integrated in the new GVA 5009, thus achieving in:

- lower energy consumption
- better efficiency
- higher quality

8. Automatic take-up Winder for 24, 36, 48, 60 or 72 ends  
Gilbos SmarTakeUp Winder





New Frieze Unit, Twinrollbox



False Twist

### TWINROLLBOX (TRB) for production of “frieze or textured yarn”

#### FRIEZE YARN:

The TRB consists of 6 single-driven Twinrollboxes with individual adjustment of the friezing rate, allowing the yarn plant to produce a variety of textures at the highest level of quality, especially also BCF yarn. Through the TRB all types of frieze with every kind of yarn with a maximum speed of 600 m/min and 12 ends per position (channel) are producible. Strongest frieze effect, even on very low twist yarn is adjustable if wanted.

The TR Box works with or without steam. The yarn is carried to the conveying belt on a chute. Perfect reproducibility of the frieze effect because of computer controlled (CoMoSys) and recallable adjustment of all six TRB's. Best yarn quality with all advantages of a “GVA (Suessen)” heat-setting especially high quality, less shrinkage and maximum bulk.

#### ADVANTAGES OF THE TWINROLLBOX TRB:

- › Individual variation of the frieze character, but with NEW pneumatic Cylinder it is also possible to adjust the same frieze character on all 6 positions.
- › The intensity of the frieze character depends only little on the twist of the yarn – thus means much lower production costs
- › Due to possible variations of adjustment, frieze

effects from a very slight frieze (similar to knit-de-knit) up to very strong frieze can be produced

- › Nearly 100% runnability, no yarn will be wound up
- › Very material gentle conveyance (no fiber breaks or grinding spoors)
- › High production speed 600 m/min
- › High production quantity (12 threads)
- › No pulsation, thus continuous stuffer pressure, thus consistent frieze character
- › Smooth and consistent laying of the yarn onto the conveyor belt (chute)
- › Very continuous steam supply – increases the quality of the frieze character
- › By means of transport air, also most complicated materials can be processed
- › Due to the variety of adjustment possibilities, you can adapt to the yarn – it is thus possible to run with yarns and materials which has not been feasible up to now (grass, PP twist 90)
- › Simple operability because of ergonomically formed components
- › Simple control and monitoring via “COMOSYS” (touch panel)

#### STRAIGHT YARN:

New Quick-Change to change between frieze and straight yarn production within a very short time (5 - 10 minutes).

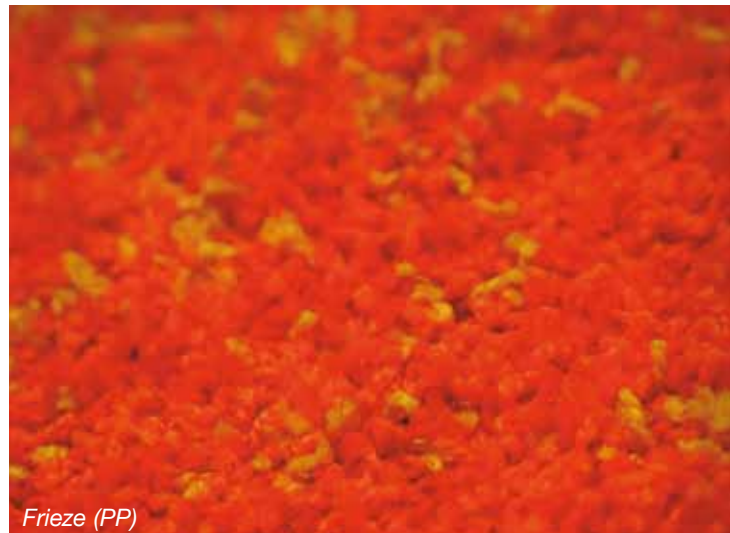




*Straight Set high pile*



*Straight Set low pile*



*Frieze (PP)*

### **Overheated Heatsetting (GVA)**

The structural pattern of the different materials will be rearranged during the heat-setting process due to heat in connection with steam and with this process the twist in the yarn will be set. Same time, the internal tension of the fibres, which was generated during the spinning, twisting and cabling process, will be removed and the new state stabilized. The bulk and form of textiles will be defined.

As long as no higher temperatures are used, this state remains stable. Thus, following will be achieved with regards to quality:

- › Better look (optics) due to defined tip
- › Robust pile
- › Flame-retardant
- › High bulk
- › After-shrinkage due to heat will be prevented
- › Better dyeing performance
- › Soil-resisting





Tufted Carpet (Nylon)



Heat-set frieze (PP)

## Our support is your advantage – We will provide you with full customer support:

- › Analyzing your specific market demands in order to identify the optimum heat setting method – Superheated or Saturated steam
- › Trial runs in our lab – to demonstrate the capability of our machines to produce the quality you require
- › Economic calculations to demonstrate return on investment
- › Preparation of the quotation, customized to your requirements
- › Financing solutions

**We are at your service!**

***power-heat-set***

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