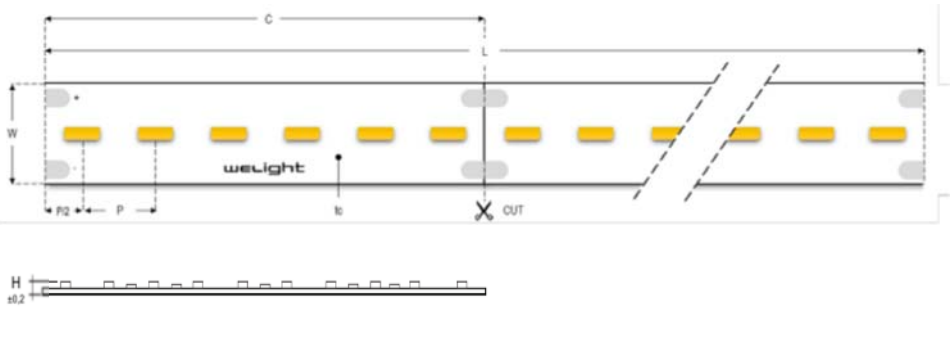
# LEDtape 700 HDE - High Density Efficiency

IP20/IP65




## Highlights

- Ready-to-connect flexible LED-strip with High Density and Efficiency – HDE
- Constant Current Driven IC for professional lighting applications
- 144 LEDs per meter – ideal for homogenous lighting at close distances
- Excellent white color consistency MacAdams SDCM ≤5
- High color rendering index CRI > 80
- Perfect for shelf and accent lighting, e.g. slim linear profiles with opal cover
- Reflective white copper PCB for optimal system efficiency
- High quality adhesive 3M-tape on backside for easy mounting on clean surface or cooling profile
- Long lifetime: L70 = 50.000h ①

## Applications

- Shelf Lighting
- General Lighting
- Food Lighting
- Accent Lighting

## Electrical Properties

- Supplied with constant voltage 24 VDC
- Connect up to 5 meters in series
- Optimized for high resolution dimming 0,1-100% using Tridonic and feno digital drivers controlled via switchDIM, DSI, DALI or DMX.

## Standards

→ page 2

## Accessories/Options

- Outdoor version IP65 with silicon casing
- Aluminum profiles for linear and corner applications
- Wide variety of lenses and covers 15°/30°/60°/120°
- Fixed or adjustable mounting brackets
- Large selection of drivers and control systems to fit every need and application

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| Type | Article Code | Supply Voltage (VDC) ③ | Color (K) | Photometric Code ⑤ | Typ. Data per meter ① ② | | | | Pitch Distance (P) | Cutting Length (C) | LxWxH (mm) | Energy Class (EEI) | Operating temp (°C) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Luminous flux (lm) | Current (mA) | Power (W) | LED quantity | | | | | |
| LEDtape 830 700 HDE | W1004-83002441441 | 24 | 3000 | 830 / 559 | 680 | 360 | 8,6 | 144 | 7 mm | 42 mm | 5040x10x2 | A+ | -20 °C +55 °C |
| LEDtape 830 700 HDE IP65 | W1104-83002441441 | 24 | 3000 | 830 / 559 | 646 | 360 | 8,6 | 144 | 7 mm | 42 mm | 5040x14x6 | A+ | -20 °C +35 °C |
| LEDtape 840 700 HDE | W1004-84002441441 | 24 | 4000 | 840 / 559 | 720 | 360 | 8,6 | 144 | 7 mm | 42 mm | 5040x10x2 | A+ | -20 °C +55 °C |
| LEDtape 840 700 HDE IP65 | W1104-84002441441 | 24 | 4000 | 840 / 559 | 684 | 360 | 8,6 | 144 | 7 mm | 42 mm | 5040x14x6 | A+ | -20 °C +35 °C |
| LEDtape 860 700 HDE | W1004-860 | 24 | 6000 | 860 / 349 | 705 | 360 | 8,6 | 144 | 7 mm | 42 mm | 5040x10x2 | A+ | -20 °C +55 °C |
| LEDtape 860 700 HDE IP65 | W1104-860-IP | 24 | 6000 | 860 / 349 | 670 | 360 | 8,6 | 144 | 7 mm | 42 mm | 5040x14x6 | A+ | -20 °C +35 °C |

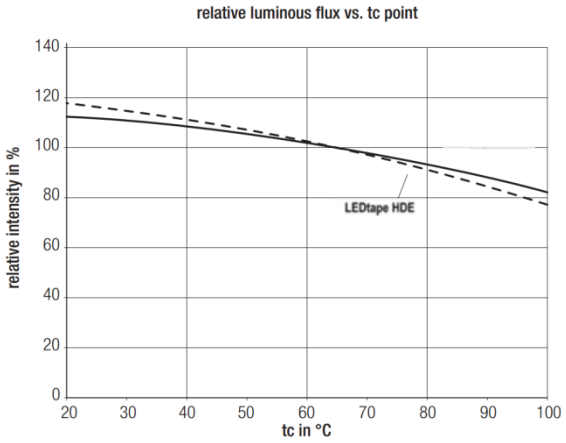
① All values for ta = 25 °C / tc = 65 °C
② Tolerance range for electrical and optical data ±10%
③ Exceeding the maximum operating voltage leads to an overload on the tape. This may result in a significant reduction in lifetime or even destruction of the tape. Tolerance range for the supply voltage 24V: +2V / -0V
④ Self-cooling at ta ≤ 35 °C
⑤ According to IEC 62717

## Standards

- EN 55015:2006 + A1:2007 + A2:2009
- EN 61000-3-2:2006 + A1:2009 + A2:2009
- EN 61000-3-3:2008
- EN 61547:2009
- EN 62471:2008
- IEC/PAS 62717

## Thermal behavior

| | |
|---|---|
| **Storage Temperature** | -30/+60 °C |
| **Operating Temperature** | -20/+35/+55 °C |
| **Tc max** | 75 °C |




## Thermal design and heat sink

The rated life of LED-products depends to a large extent on the temperature. Welights excellent thermal design for the LED-tape products provides the lowest thermal resistance and therefore allowing new compact designs without sacrificing quality, safety and life time. However, if the permissible temperature limits are exceeded, the life of the LED-tape will be greatly reduced or the LED-tape may be destroyed.

It might be necessary to mount the LED-tape onto a heat sink, e.g. an aluminum profile. The size of the heat sink is largely depending on the ambient temperature (ta) of the application. The following tables should be seen as a guide to a recommended heat sink depending on different ta:

LEDtape 700 HDE (per meter)

| Ambient Temperature (Ta) | Reference Temperature (Tc) | Cooling Area ($cm^2$) | Thermal Resistance $R_{thHS-A}$ | Recommended Aluminum profile |
|---|---|---|---|---|
| 25 °C | 65 °C | Self-cooling | Self-cooling | Optional |
| 35 °C | 65 °C | Self-cooling | Self-cooling | Optional |
| 45 °C | 65 °C | 300 | 2,1 K/W | Z200-2 / Z201-2 / Z22W-2 |
| 55 °C | 65 °C | 400 | 1,8 K/W | Z22W-2 |

LEDtape 700 HDE IP65 (per meter)

| Ambient Temperatur e (Ta) | Reference Temperature (Tc) | Cooling Area ($cm^2$) | Thermal Resistance $R_{thHS-A}$ | Recommended Aluminum profile |
|---|---|---|---|---|
| 25 °C | 65 °C | Self-cooling | Self-cooling | Optional |
| 35 °C | 65 °C | Self-cooling | Self-cooling | Optional |
| 45 °C | Not allowed | - | - | - |
| 55 °C | Not allowed | - | - | - |

## Rated life time

The temperature at tc reference point is crucial for the light output and life time of an LED-tape. For the welight LED-tape a tc temperature of 65 °C is recommended in order to achieve an optimum between heat sink requirements, light output and life time. Compliance with the maximum permissible reference temperature at the tc point must be checked under operating conditions in a thermally stable state. The maximum value must be determined under worst-case conditions for the relevant application.

| tc temperature in °C | luminous flux in % | lifetime in h |
|---|---|---|
| 25 | 80 | 60,000 |
| | 70 | 81,000 |
| | 50 | 132,000 |
| 45 | 80 | 44,000 |
| | 70 | 64,000 |
| | 50 | 110,000 |
| 65 | 80 | 32,000 |
| | 70 | 50,000 |
| | 50 | 91,000 |

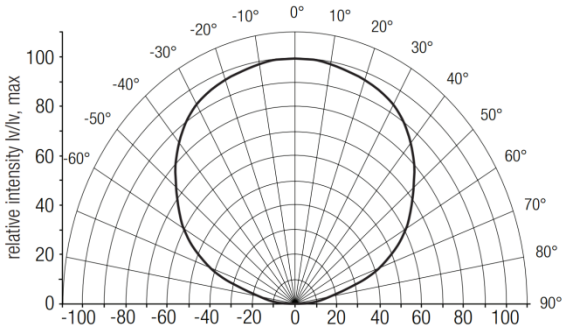
## Failure fraction

The failure fraction (Fy) corresponds to the rated life of the LED. The percentage (y) of a number of LEDs of the same type at their rated life designates the percentage (fraction) of failures. This failure fraction expresses the combined effect of all components of the LED-tape including mechanical, as far as the light output is concerned. The effect of the LED could either be less light than claimed or no light at all.

| Type | Unit | Rated Life | Failure fraction (Fy) |
|---|---|---|---|
| LEDtape 700 HDE | 1 meter | L70 = 50 000 h (tc = 65 °C) | 5% (0,1% per 1000 hours of operation) |

## Light Distribution

Radiance Angle = 120°





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## **Photometric Code** (according to EN 62717)

| 1 st digit | | 2nd + 3rd digit | 4th digit | 5th digit | 6th digit | |
|---|---|---|---|---|---|---|
| Code | CRI | Color temperature in Kelvin x 100 | Initial MacAdam ellipse SDCM | Maintained MacAdam ellipse SDCM after 25%of the lifetime (6000 h) | Lumen maintenance after 25%of the lifetime (6000 h) | |
| | | | | | Code | Light Output |
| 7 | 67 – 76 | | | | 7 | ≥ 70 % |
| 8 | 77 – 86 | | | | 8 | ≥ 80 % |
| 9 | 87 – ≥90 | | | | 9 | ≥ 90 % |

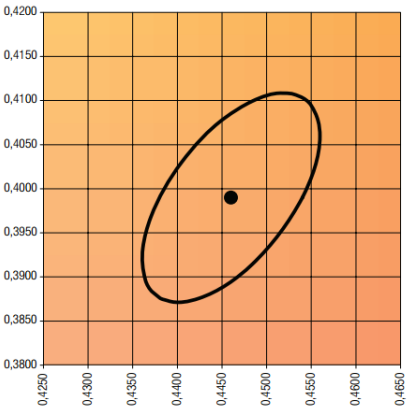
## **Chromaticity coordinates and tolerances** (according to CIE 1931)

| White Tone | CCT | Photometric Code |
|---|---|---|
| Warm | 3000 K | 837 / 559 |
| Neutral | 4000 K | 840 / 559 |
| Cool | 6000 K | 860 / 349 |

The specified color coordinates are measured by a current impulse with nominal values of module after a settling time of 100 msec. The ambient temperature of the measurement is ta = 25 °C. The measurement tolerance of the color coordinates are ± 0.01.

**3,000 K**

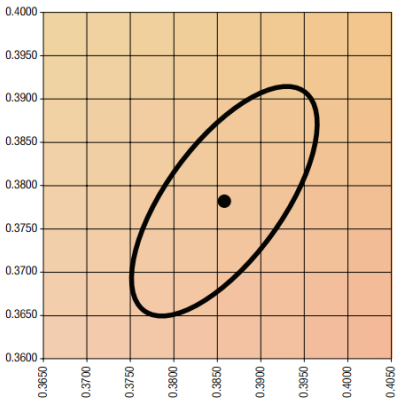
| | x0 | y0 |
|---|---|---|
| Centre | 0.4460 | 0.3990 |




MacAdam ellipse: 5 SDC

**4,000 K**

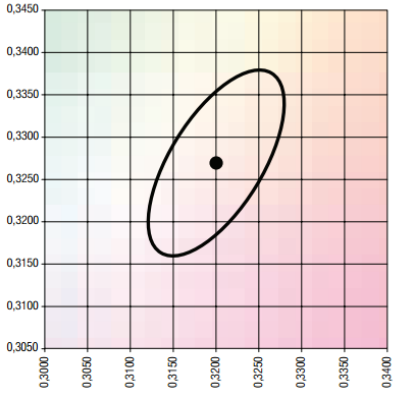
| | x0 | y0 |
|---|---|---|
| Centre | 0,3860 | 0,3780 |




MacAdam ellipse: 5 SDCM

**6,000 K**

| | x0 | y0 |
|---|---|---|
| Centre | 0,3200 | 0,3270 |




MacAdam ellipse: 3 SDCM

# Mounting Instructions

## Mechanical

Never bend the LED-tape at a radius smaller than 50 mm. Assembly must not damage or destroy conducting paths on the circuit board.

The LED module itself and all its components must not be mechanically stressed.

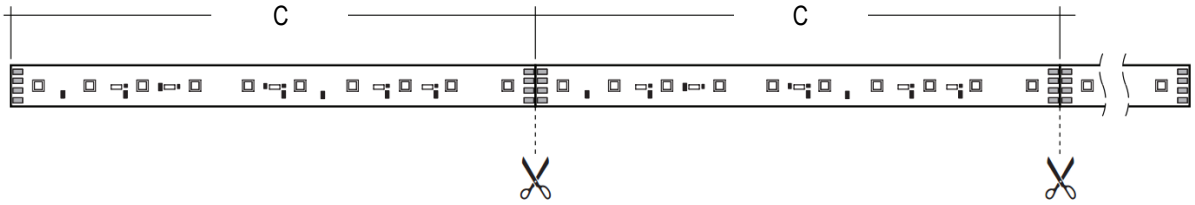
The fixing/cooling surface must be properly cleaned to remove grease, dirt and silicon before application, e.g. using Isopropyl alcohol. When fixing the LED-tape to a surface, apply an even but gentle pressure and try to avoid applying pressure directly on the LED itself (the maximum allowed pressure is 20 N/cm²).

After assembly always check that the entire length of the tape has attached properly to the surface and that there is no air pockets underneath the PCB.

The thermal length expansion coefficient of the PCB is 17*10^-6cm/cm/K. When installing in environments with large variations in temperature (e.g. outdoor applications) and operating length of more than 2 m, the use of metallic mounting surfaces is necessary. Otherwise it is advisable to use an additional thicker adhesive tape to absorb the stress of any mismatch in expansion coefficients, e.g. 3M 9119-140 mic.

## Cutting

The LED-tape is separable at every 6 LEDs or multiple thereof with the full function of each LED segment. It is only allowed to cut the LED-tape at the indicated cutting line.




When cutting the IP65-version it is recommended to use the included silicon kit to re-seal the LED-tape according to the instructions on page 5.

## Soldering

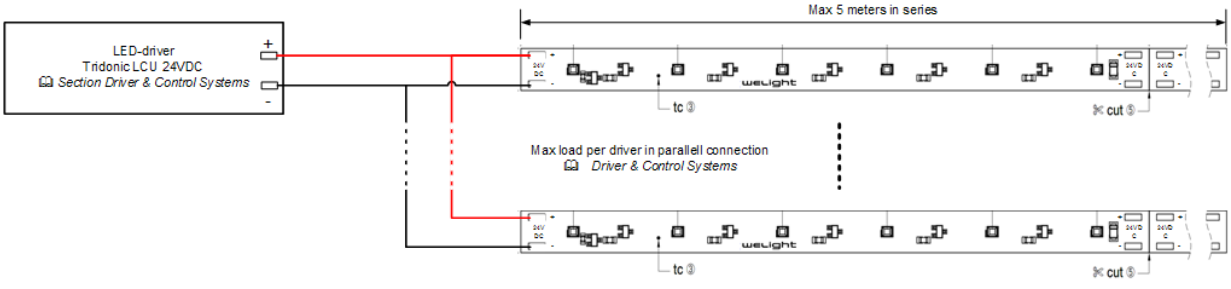
Without heat sink:
- Pre-tin the cables only
- Soldering temperature max 300 °C during 4 seconds

With heat sink:
- Pre-tin solder pads and cables
- Soldering temperature max 350 °C during 3 seconds

## Wiring

Each reel of LED-tape is delivered with color coded connection cable L=350mm, 2x0,5 mm². Do not connect more than 5 meters of the LED-tape in series. When connecting several sections in parallel please refer to the table *Driver & Control Systems* for the allowed total length connected to one controller/dimmer.

| Color | Red | Black |
|---|---|---|
| Function | + | - |

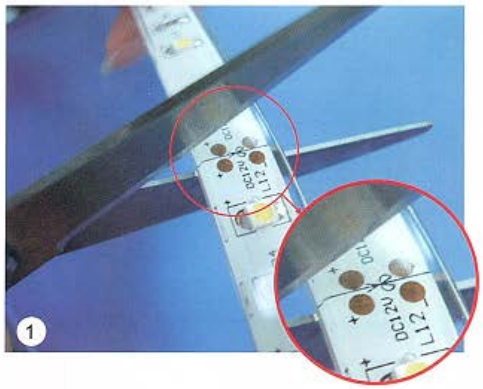



## Electrical connection

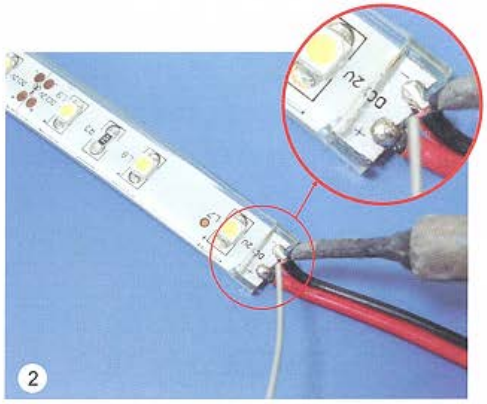
In order to drive welight LED-tapes safely, it is absolutely necessary to operate them with an electronically stabilized power supply protecting against short circuits, overload and overheating. Always use our approved drivers and controls to power the LEDtape – refer to *Driver & Control Systems.* If the wrong type of driver is used the product warranty is void.

Electronic control gear for LED should carry the CE mark and ENEC certified. In Europe the declarations of conformity must include the following standards: CE: EC 61347-2-13, EN 55015, IEC 61547 and IEC 61000-3-2 - ENEC: 61347-2-13 and IEC/EN 62384. Also check for the mark of an independent authorized certification institute. Tridonic electronic control gear complies with all relevant standards and guarantees safe operation.

## How to cut and rejoin the LED strip:




1. Please cut the LED strip at the cutting line.




2. Rejoin the cables to the strip by soldering, please do not reverse the polarity.



3. Get the end-caps from the accessory bag, make a small hole on each end-cap.


4. Put the end-cap on the end of LED strip, get the wires through the small hole.


5. Twist off the cap of glue tube, make a hole on the tube with the awl of the cap or other sharp objects.



6-7. Put the needle on the top of glue tube, cut the top of the needle at an angle of 45~60 degrees.



8-9. Dispense the glue on the gap between the end-cap and LED strip, and the small hole on the end-cap. Please wait for 30 minutes till the glue gets solidified.

# Accessories

## Cable & Connection accessories


1


2


3


4


5

| | Type | Art. Code | Description | LEDtape IP20 | LEDtape IP65 |
|---|---|---|---|---|---|
| 1 | LEDaccessory IP Assembly Kit 10 | W8901 | 5 End Caps, 10 Mounting Brackets & Silicon (one kit is included on delivery) | ○ | ● |
| 2 | LEDaccessory LED Cable 100m Indoor | W8407 | H03VVH 2X0.75 Rd/Bl, White Insulation, 100 m | ● | ○ |
| 3 | LEDaccessory LED Cable 100m Outdoor | RKKB2X1 | RKKB 2X1 Rd/Bl Yd 5,8mm Black Insulation 100 m | ○ | ● |
| 4 | LEDaccessory CON IP20 kit F+M | W8412-A1 | Quick Connector kit with female and male plug including 30 cm cable, black | ● | ○ |
| 5 | LEDaccessory CON IP68 kit F+M | W8411-A2 | Quick Connector kit with female and male plug including 30 cm cable, white | ○ | ● |

## Driver & Control Systems

(a) Select the way you want to control your system and (b) chose a driver that matches your LED-power.

(a)


1


2


3


4


5

| (a) | Control Signal | Dimmer Type | Art. Code | Max length per dimmer | Multiple dimmers allowed |
|---|---|---|---|---|---|
| 1 | 1-10V | feno fd analog 1-24e | 00000066 | 16 meter | Yes |
| 2 | DALI one4all ① | feno fd multi 1-24e | 00000303 | 16 meter | Yes |
| 3 | DALI one4all integrated ①② | Tridonic K210 | 86455937 | 2,9 meter | Yes |
| 4 | DMX | feno fd dmx 1-24e | 00002100 | 16 meter | Yes |
| 5 | IP44 Dimmer Protection Kit | All of the above | 24138842 | - | - |

① one4all supports switchDIM (dimming via phase impulse), DSI and DALI in the same dimmer.
② The dimmer has a 25W integrated LED-driver and cannot be used together with external LED-driver in table (b).

(b)





1 2 3 4 5

| (b) | Power | Driver | IP20 Art. Code | IP67 Art. Code |
|---|---|---|---|---|
| 1 | 25 W | Tridonic LCU 025/24 | 86453418 | - |
| 2 | 35 W | Tridonic LCU 035/24 | 24166320 | - |
| 3 | 60 W | Tridonic LCU 060/24 | 24166324 | 22185184 |
| 4 | 100 W | Tridonic LCU 100/24 | 24166328 | 22185185 |
| 5 | 150 W | Tridonic LCU 0150/24 | 24166333 | 22185186 |

LED-drivers <25 W available on request. Please contact us at info@ljuskontroll.com for information about suitable end-user control interfaces, e.g. touch panels, color mixing software, potentiometers, push-buttons, etc.

## Aluminum Profile Systems

Start by selecting an aluminum profile (a) and a suitable lens cover (b) and then add optional accessories (c).

(a)



1 2 3

| | | | | | | | | | Optional accessories | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (a) | Type | Art. Code | L (mm) | W (mm) | H (mm) | W (mm) incl. lens cover | H (mm) incl. lens cover | Application | Lens Cover | End Cap | Fixed Mount | Adjustable Mount |
| 1 | Z200-2 | 24166148 | 2000 | 18 | 9 | 21 | 16 | Corner | ● | ○ | ○ | ○ |
| 2 | Z201-2 | 24166149 | 2000 | 18 | 9 | 21 | 16 | Linear Slim | ● | ● | ● | ○ |
| 3 | Z22W-2 | 24166150 | 2000 | 18 | 16 | 21 | 24 | Linear | ● | ● | ● | ● |

(b)





1 2 3 4 5

| | | | | | Profile | | |
|---|---|---|---|---|---|---|---|
| (b) | Type | Art. Code | L (mm) | Typ. application | Z200-2 | Z201-2 | Z22W-2 |
| 1 | 15° | 24166409 | 2000 | Wall wash | ● | ● | ● |
| 2 | 30° | 24166410 | 2000 | Wall wash | ● | ● | ● |
| 3 | 60° | 24166411 | 2000 | Shelf | ● | ● | ● |
| 4 | 120° | 24138737 | 2000 | Accent | ● | ● | ● |
| 5 | 120° opal | 24138736 | 2000 | Lines | ● | ● | ● |

(c)


1


2


3


4


5

| | | | Profile | | |
|---|---|---|---|---|---|
| (c) | Type | Art. Code | Z200-2 | Z201-2 | Z22W-2 |
| 1 | End cap Grey PMMA | 24166334 | ○ | ● | ○ |
| 2 | End Cap Aluminum | 24139174 | ○ | ○ | ● |
| 2 | End Cap Aluminum Cable Entry | 24139173 | ○ | ○ | ● |
| 3 | Mounting Bracket 0° | 88166859 | ○ | ● | ● |
| 4 | Mounting Bracket 15° | 88167372 | ○ | ● | ● |
| 4 | Mounting Bracket 30° | 88167373 | ○ | ● | ● |
| 4 | Mounting Bracket 45° | 88167374 | ○ | ● | ● |
| 4 | Mounting Bracket 60° | 88167375 | ○ | ● | ● |
| 5 | Mounting Bracket Adjustable | 24166024 | ○ | ○ | ● |





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