

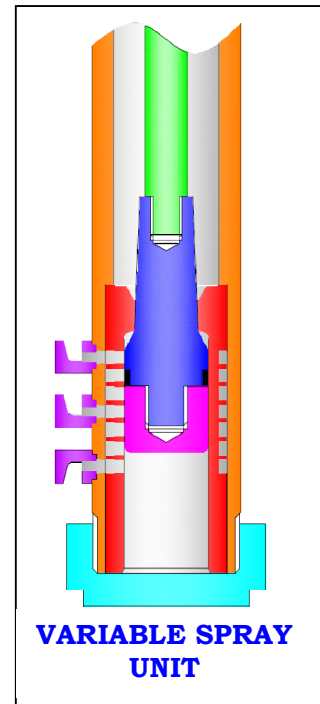
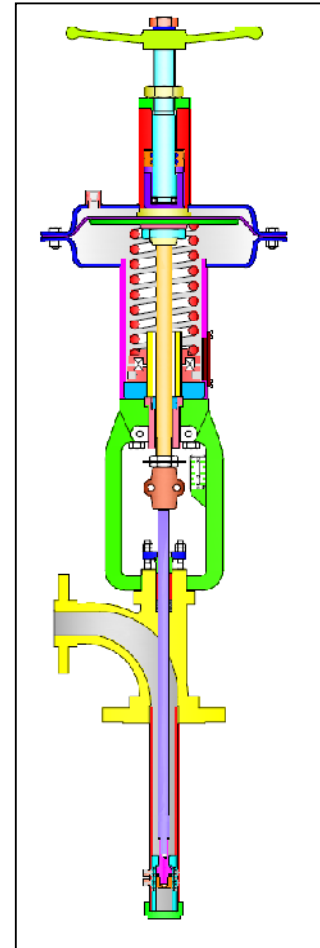
## DESUPERHEATER

Desuperheater is a device that reduces the temperature of superheated steam so that it can be used effectively for heating or for other industrial use. This temperature reduction or attemperation is performed by desuperheater, which is essentially a device that injects a predetermined amount of water into a steam flow stream.

The desuperheaters are highly effective in controlling steam temperature close to saturation point over a broad set of steam conditions

The desuperheater provide effective heat transfer between steam and water. A highly effective desuperheater design and application ensures that costly problems are avoided including extended startup and shutdown times, reduced process efficiency and general wear of downstream piping and equipment.

Pneucan incorporate latest technology in the spray nozzle design. The high quality surface finish minimises frictional losses, thereby ensuring that the total pressure difference between water and steam is available for atomisation of water.



### SPECIFICATIONS

<b>DESIGN</b>	: ASME B16.34
<b>TYPE</b>	: Variable Spray - Series 810 Fixed Spray - Series 820 Multinozzle Spray - Series 830
<b>SIZE</b>	: 1.1/2" X 3" upto 600 ANSI 1" X 3" upto 900 ANSI - Series 820 2" X 4" upto 1500 ANSI
<b>Cv</b>	: Refer to Table 1.
<b>RANGEABILITY</b>	: Maximum 45 to 1.
<b>VALVE TRAVEL</b>	: 38mm.(For Variable Spray - Series 810)
<b>BODY MOC</b>	: ASME A216 Gr. WCC, WC6 & WC9
<b>BODY TUBE</b>	: Stainless Steel.
<b>GUIDE /SEAT</b>	: Stellite 6
<b>PLUG/STEM</b>	: Stellite 6/316
<b>SEALING RINGS</b>	: Carbon
<b>ATOMISERS</b>	: 316 Stainless Steel (CF8M)
<b>GLAND PACKING</b>	: Grafoil
<b>FLOW CHARACTERISTICS.</b>	: Refer Graph - 1
<b>ACTUATOR</b>	: Diaphragm with TMH / Electrical
<b>DIAPHRAGM</b>	: Nitrile
<b>SPRING RANGE</b>	: 3 – 15 PSIG (0.2 – 1.0 Kg/cm <sup>2</sup> ) 6 – 30 PSIG (0.4 – 2.0 Kg/cm <sup>2</sup> )
<b>AIR SUPPLY</b>	: 20 – 35 PSIG (1.4 – 2.5 Kg/cm <sup>2</sup> )
<b>AIR CONNECTION</b>	: 1/ 4" or 1/ 2" NPT
<b>ACCESSORIES</b>	: Valve Positioner - Pneumatic, E/P, Smart.
<b>OPTIONAL</b>	: Airset, Solenoid Valve, Air Lock, Volume Booster, Position Transmitter etc.

**BUILT IN RELIABILITY**

PVCT-800

### PERFORMANCE AND DESIGN FEATURES

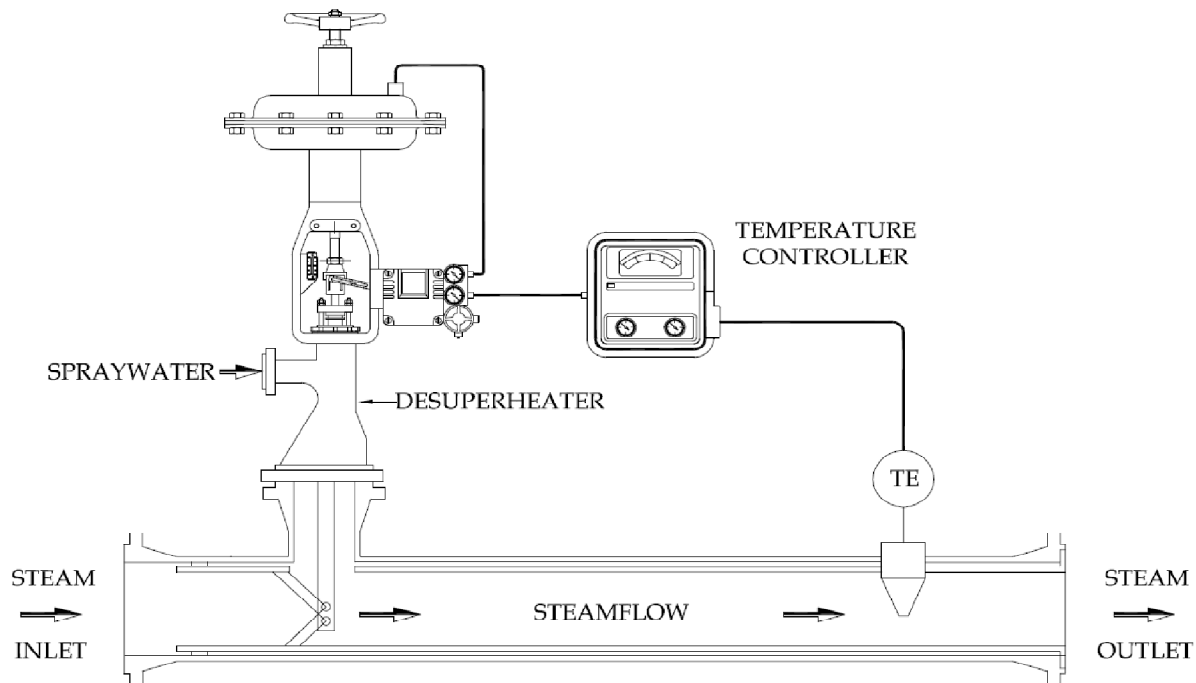
- High efficient atomization.
- Accurate and repeatable control of fluid temperature.
- Tight shut off variable spray unit.
- High rangeability variable area spray unit.
- Erosion resistance materials of selection.
- Ease of installation.
- Low maintenance features.
- High integrity stem sealing arrangement.
- Thoroughly checked at factory to ensure that it meets the specified performance on site with high integrity.
- Quality assurance at every stage of manufacturing.
- Comprehensively designed and tested to ensure its optimum performance for the tough process Parameters specified.
- Built in latest technology in the spray nozzle designs.

### QUALITY AND PERFORMANCE GUARANTEE

- Produced with Quality Systems accredited to ISO 9001: 2008 by Bureau Veritas.
- Full material certification available for all major component Parts.
- Full guarantee on design and Performance.
- All testing performed to the requirements of ANSI B16.34.

### PRINCIPLE OF OPERATION

For the most efficient use of heat energy from steam, it is necessary to reduce the temperature of superheated steam to near the saturation temperature. The high temperature of superheated steam provides the large amount of energy that is used for water vaporization resulting in an increased flow of steam at a lower temperature. By having the amount of water added the temperature is controlled. The rate of cooling depending on spray water drop size, distribution and



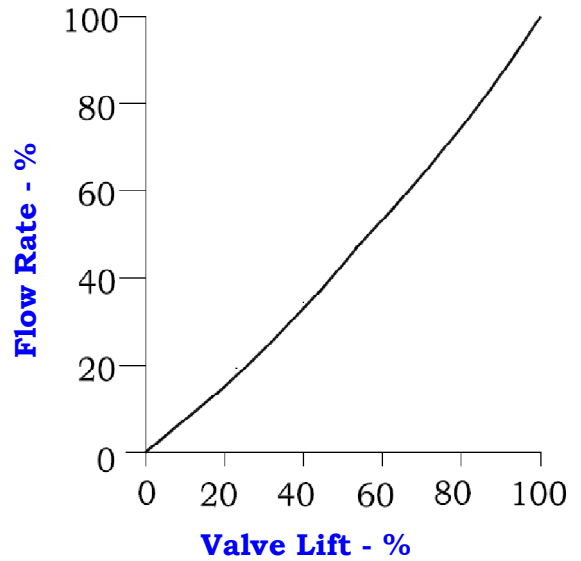
DRAWING No. 1

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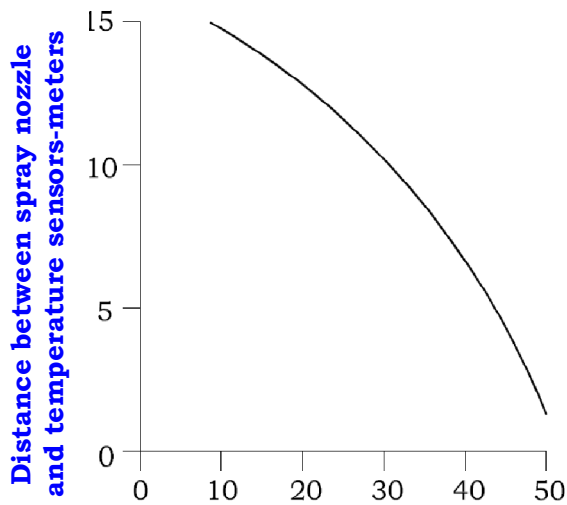
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NOZZLE NUMBER	Cv (USGPM)
0	0.25
1	0.5
2	1.0
3	2.0
4	4.0
5	6.5
6	9.0

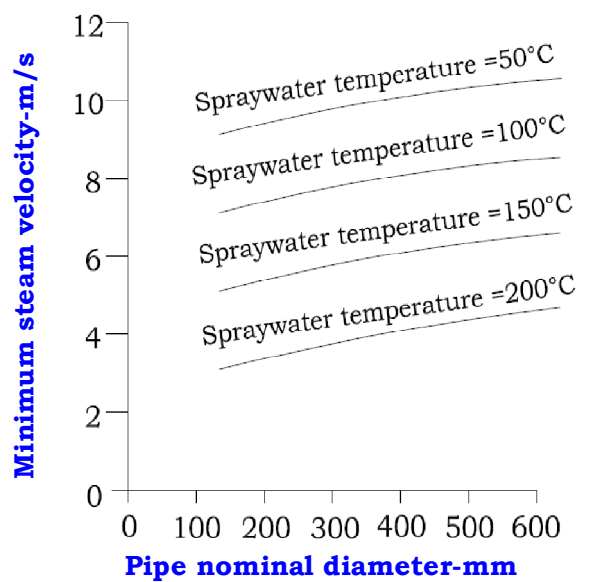
**Cv - VALUES Table No. 1**



**CHARACTERISTIC VARIABLE  
SPRAY  
Graph - 1**



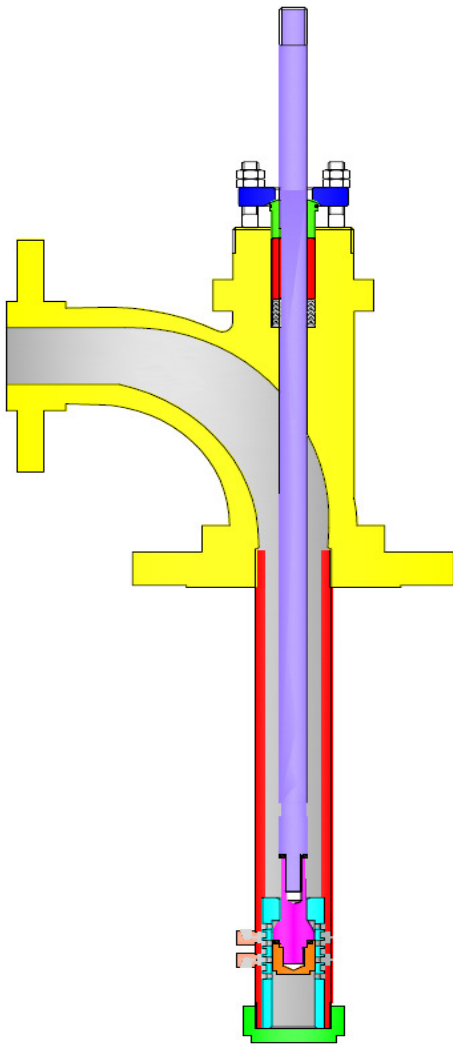
**MINIMUM DISTANCE FOR  
TEMPERATURE SENSOR POINTS  
Graph - 2**



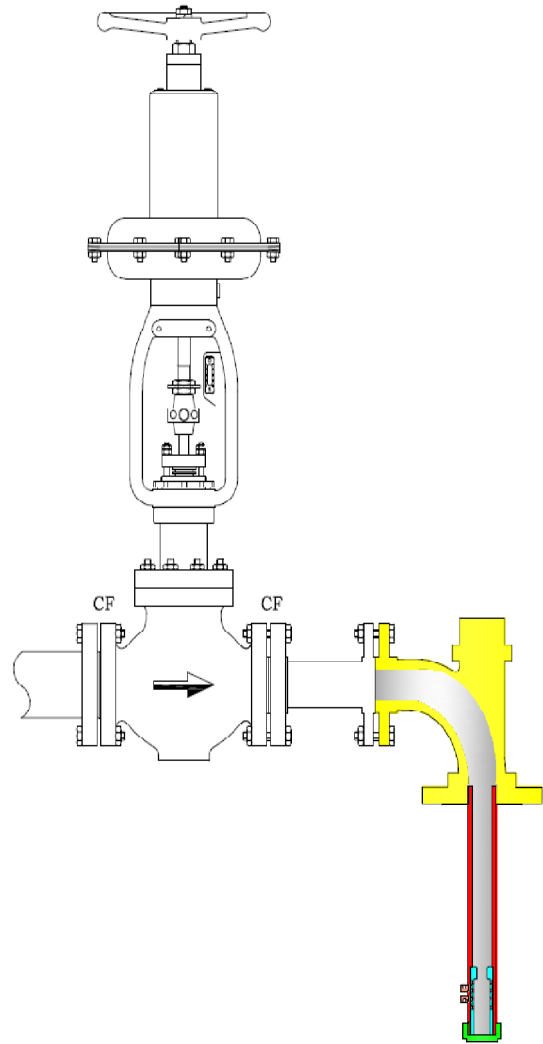
**MINIMUM STEAM VELOCITY FOR  
PIPE DESUPERHEATING UNITS  
Graph - 3**

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**VARIABLE SPRAY - SERIES 810**



**FIXED SPRAY - SERIES 820**



Pneucan Desuperheater incorporates latest technology of multiple spray nozzle assembly. It is direct contact type desuperheater where by a measured amount of water is added to the superheated steam through nozzle assembly. The high quality surface finish minimizes frictional losses, there by ensuring that the total pressure difference between water and steam is available for atomisation of water.

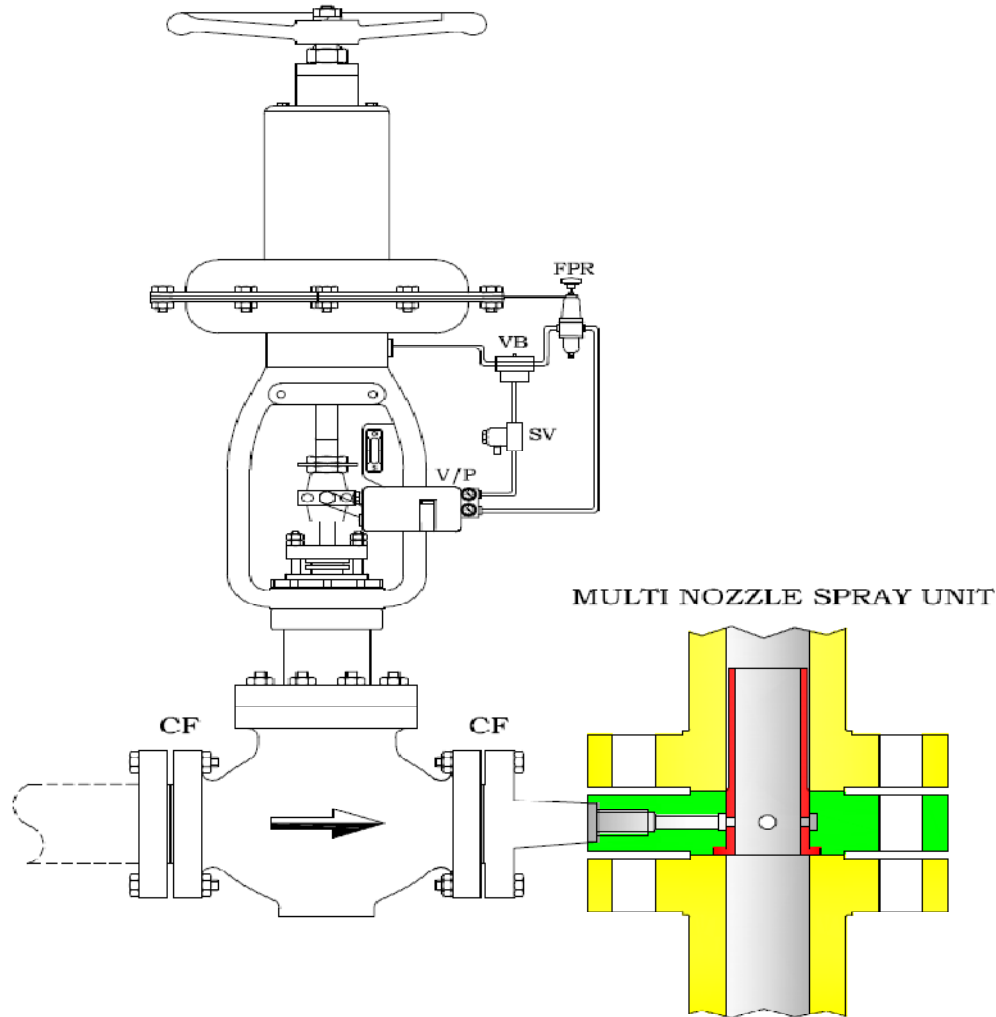
Nozzle assembly is served by individual feedholes in the spray chamber (cage). Water enters the chamber through control orificed (seating contact). The relatively large volume of this chamber ensures that water is proportioned evenly through each orifice. The  $\Delta p$  across this spray chamber head results in an increase in the fluid velocity. Water is subsequently rotated in the nozzle chamber before being emitted through the feed hole.

The combination of splitting the feed flow, increasing velocity and rotating effects, ensures that the water is injected into the system in a fine symmetrical hollow cone spray. The nozzles are assembled with the spray chamber and are sealed.

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**MULTINOZZLE SPRAY - SERIES 830**



The Multi nozzle spray assembly is developed for small steam pipe line size of less than 6-inch that cannot accommodate an insertion style desuperheater. The unit is designed as a wafer that is installed between two flanges in the steam pipe line. A reduced diameter throat venturi allows water to spray completely around the wafer and permits multiple points of spraying either through drilled holes or small nozzles.

In addition, the venturi increases the steam Velocity at the point of injection, which enhances atomization and mixing in steam flow velocities as low as approximately 10 feet per second (3 meters per second) under optimum conditions. It handles applications requiring control over moderate load change (rangeability up to 20:1). It can be installed in steam pipe line sizes of 1" through 4", and is available for moderate Cv requirement. This design requires an external water control valve to meet water flow based on a signal from a temperature sensor in the downstream steam line.

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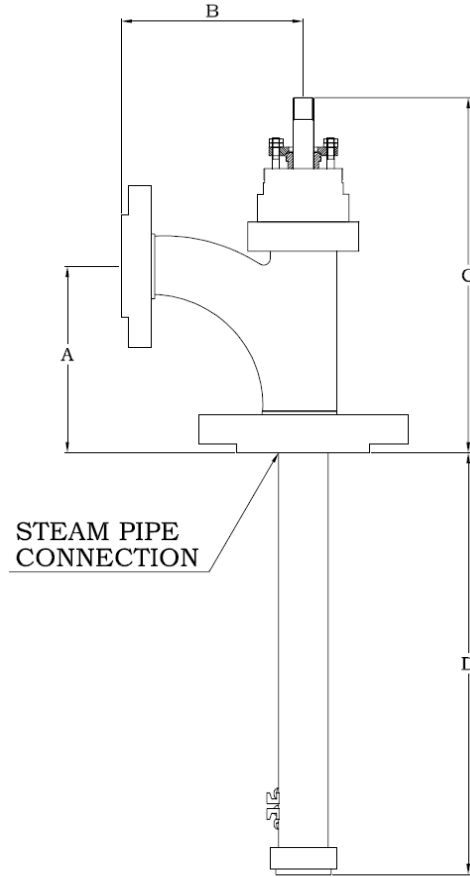
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## **GUIDELINES ON INSTALLATION OF DESUPERHEATER**

The following guidelines detail the installation requirements to achieve maximum efficiency from Desuperheater.

- 1)** The installation of Desuperheater should be with the flange orientation as per Drawing No.1.
  - Spray water must be injected in the direction of the steam flow.
  - To facilitate installation of the water supply line, one of the following four positions have to be indicated.
    - a) Along direction of flow
    - b) Transverse right to direction of flow.
    - c) Opposite to direction of flow.
    - d) Transverse left to direction of flow.
- 2)** Minimum length of straight pipe work following Desuperheating unit should be 5 Meters.
- 3)** Installation of a strainer with a mesh size of approximately 0.25mm in the water supply line to prevent the nozzles from clogging is essential.
- 4)** Efficient drainage of desuperheater pipe work is essential. Large condensate traps for 10% maximum flow are required to facilitate start-up and shut down of plant.
- 5)** Controlled temperature to be higher than 6°C (43°F) above saturation point.
- 6)** To achieve satisfactory evaporation the percentage ratio of water to steam should not exceed 15%. The exact value is dependant on each application and The factory should be consulted if this figure is to be exceeded.
- 7)** Where the variable spray unit is required to shut off for long periods, it is recommended that an upstream motorized isolating valve is incorporated into the system.
- 8)** The distance of the temperature sensor point from the desuperheating unit shown in Graph No 3. The optimum distance between water injection point to the temperature sensor mounted downstream should be 12 - 15 mts.
- 9)** For maximum steam turndown applications, a high superior pressure of condensate is necessary. It is also necessary to keep the steam flow rates (for max & min conditions) as practical as possible else the turndown ratio increases unnecessarily which necessitates the selection & use of a combination of nozzles in the same spray cylinder.
- 10)** Minimum inlet velocity should be 15 mts/sec for Fixed Nozzle Desuperheater & 7 mts/sec for Variable Nozzle Desuperheater.

### MOUNTING DIMENSION



Nozzle Numbers	Travel mm	'A' mm	'B' mm	'C' mm	D' Based on pipe dia		'øE' mm	'F' mm	Condensate Connection mm	Steam Connection mm	Rating ANSI	Standard Actuator
					>150 <250	> 250						
					mm	mm						
0 - 6	38	152	171	197	305	457	286	800	40	80	150-600	PDO - 55
0 - 6	38	216	229	276	305	457	286	800	50	100	900-1500	PDO - 55

The Company's policy is one of continuous product improvement and the right is reserved to modify the specifications contained herein without notice.



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