

# JF-Fabriken A/S Feed Mixer and Dispenser Wagon JF FEEDER PA 15 R

## Test Report 5095



### Sale

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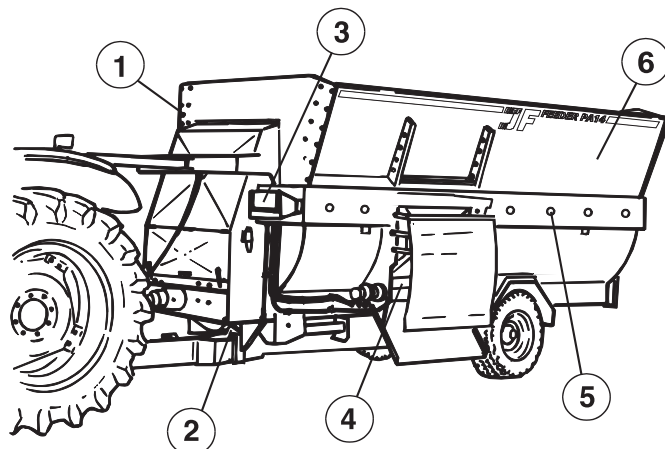
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Deutsche Landwirtschafts-  
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Prüfstelle für Landmaschinen

### Short Description

- towed, one-axle feed mixer and dispenser wagon
  - mixing shaft driven by the tractor PTO via a chain transmission;
  - mixing shaft equipped with spirally arranged paddles with rubber scrapers;
  - cylindrical mixing container with a hydraulically operated metering slide and exchangeable straw knives;
  - lateral, fixed unloading chute with a dispenser roller;
  - electronic weighing system with three weighing sensors.
- (Description and technical data cf. Page 7).*



- 1 = level control
- 2 = Hydraulic height adjustment of the mixing container
- 3 = weighing computer
- 4 = dispenser roller
- 5 = exchangeable straw knives
- 6 = mixing container

## Evaluation – Short Version

Tested Feature	Test Result	Evaluation
<b>Filling</b>		
Unloading capacity	External filling	
<b>Mixing</b>		
Mixing accuracy	LW-grass/corn      Chopped grass/corn      Corn/pellets	○
– half mixture	2,4 %                      4,1 %                      2,2 %	+/o/o
– full mixture	3,7 %                      3,8 %                      1,9 %	o/o/o
Mixing time	3 min after filling, longer mixing time recommended	+
Comminution effect	sufficient; mashing entirely excluded	o/++
<b>Weighing</b>		
Weighing system	can be used during filling	+
Accuracy (max./min. load)	<1 and 4% deviation from the actual filling weight	+
Display	swivellable; illuminated, digits 57 mm large	+/++
<b>Feed dispensing</b>		
Dispensing capacity	large, though uneven	○
Swath deposition	At some places, the swath is driven over	○
Emptying	Feed residues in the mixing container	–
<b>Operation</b>		
Coupling	can be carried out quickly	+
Operation	simple; easy to reach	+
Manoeuvring	no view to the rear	–
Feed unloading	easy to control from the driver's seat	+
<b>Power requirements</b>		
Mixing	LW-grass/corn      Chopped grass/corn      Corn/pellets	
– maximum	41 kW                      40 kW                      28 kW	
– specific	7,4 kW/t                      6,1 kW/t                      4,5 kW/t	+++/>++/++
<b>Maintenance</b>		
Lubrication points	22 (intervals cf. Page 10)	+
– Accessibility	18 freely accessible	++
– Time requirements	29 labour minutes in 100 hours of use	+
Transmission oil	SAE 80W – 90W	○
Instructions of use/list of spare parts	clear/good	+/>+
<b>Durability</b>		
Fatigue test on the test stand	no damage after alterations by the manufacturer	+
Practical use	no damage at mixing and dispensing units+	
<b>Work safety</b>		
	evaluated by DPLF	
<b>Traffic safety</b>		
	EBE report according to § 18 (5) StVZO	

Evaluation range ++ / + / o / - / -- (o = standard); during mixing: + / o

## Test Results

The JF FEEDER PA 15 R allows homogeneous feed mixtures to be produced and dispensed. The mixing container has a volume of 15 m<sup>3</sup>, of which only 12 m<sup>3</sup> can be utilized. For filling, common wheel and front loaders or mobile cranes with appropriate unloading tools can be used. The mixing system consists of nine spirally arranged paddles. The paddles are tilted and were equipped with rubber scrapers. In addition, eight exchangeable straw knives are bolted to the mixing container. The unloading chute with a dispensing roller, which is attached laterally on the left front side of the container, is a pronounced feature. The tested model PA 15 R is equipped with a pneumatic two-circuit brake. An EBE report according to § 18 (5) StVZO (German Motor Vehicle Safety Regulations) is available. When driving on public roads and paths, one must make sure that the permissible maximum speed of 25 km/h is not exceeded.

### Filling

The rectangular container opening of the PA 15 R is sufficiently large for filling. The mixing container is easily accessible from the sides and from the rear of the wagon. However, the wagon is filled exclusively from the left side. At the beginning, the rear part of the container should be filled first, if possible. Towards the end of the filling process, the remaining feed quantities should be distributed evenly over the entire container length. It depends on the loading technology used how large the filling capacity is.

Correct operation must be given particular attention. In order to achieve a continuous and even mixing effect in the longitudinal direction of the container, the wagon must be as level as possible. For this purpose, the mixing container features level control. On the front side, a sight glass filled with dark liquid is attached to the upper

right container edge. The container is level when the liquid is concentrated in the centre of the glass. Hydraulic height adjustment on the front side of the mixing container is advantageous and recommended. However, one must take into account that the mixing container may only get filled to 80% of its capacity. The feed gets lifted by the paddles and must fall down freely. If the container is too full, the required free space is not available. As a result, the feed only gets turned, not mixed. Special feed and loose bulk materials must be put in first. It even makes sense not to turn the paddle agitator until filling with these materials is complete. Long material, such as straw, should be added when the container is about half full. It should be adapted to the mixture, and certain quantities should not be exceeded. Entire round and square bales may never be put in as a whole. Only small quantities may be put into the mixing container and processed portion-wise.

A lockable filler neck (figure 5) situated at the rear of the vehicle allows small or liquid quantities, such as molasses or water, to be added from the bottom without any

problems. According to our results, the opening must be checked rather frequently because feed residues build up there during the mixing process.

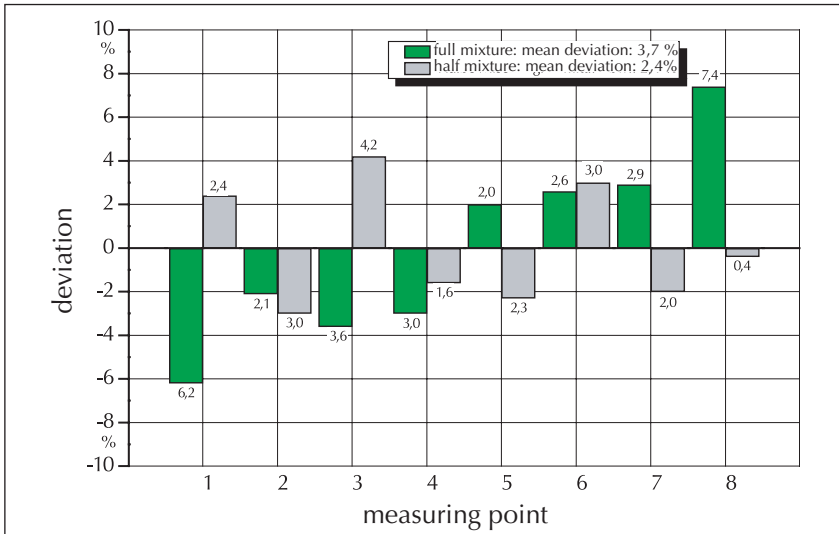
In order to guarantee clean feed loading, clamp silos should feature a foundation plate.

### Mixing

In all tested mixing variants, the PA 15 R reached the required mixing accuracy. Depending on the container volume, full and half-full mixtures were examined. It is remarkable that during mixing the rotational speed of the PTO should be limited to 400 min<sup>-1</sup>. Our limit for maximum permissible deviations of  $\pm 10\%$  for basal feed and  $\pm 5\%$  for feed concentrate at each measuring point was observed (figures 2 to 4). After the last component had been added, mixing time was limited to a standard period of 3 minutes.



Figure 1:  
*The nine paddles mix the feed extraordinarily gently. The duration of the*



**Bild 2: Deviations during the mixing of loader wagon grass/corn -full/half;**

mean deviation:	3,7/2,4 %.	
mixture:	2980/1940 kg;	dM 35.8/33,6 %
Grass silage:	1720/1200 kg;	dM 41.9/36,7 %
Corn silage	1260/740 kg;	dM 27.7/28,7 %

**Extraordinarily Gentle Mixing**

The very gentle mixing process, which conserves the structure, is impressive. In comparison with other mixing systems, the mixing time is irrelevant. In order to achieve better mixing accuracy, the mixing time should even be extended. Upon the manufacturer’s request, we prolonged the mixing time for chopped grass/corn by an additional four to a total of seven minutes after the last component had been added. As compared with our standard measurement, we found a significant improvement in measuring accuracy in both full and half mixtures. The peak deviations at each measuring point were reduced. Average deviation was 3.5 % in full mixtures and 1.6 % in half mixtures. Therefore, longer mixing times are recommended and very suitable for practical operation.

Due to the system, the comminution effect of the PA 15 R is just sufficient. The eight straw knives in the mixing container comminute longer feed structures. During this process, the feed is not cut, but rather torn apart.

Feed treatment by the nine paddles is extremely gentle. According to our results, very moist and lumpy

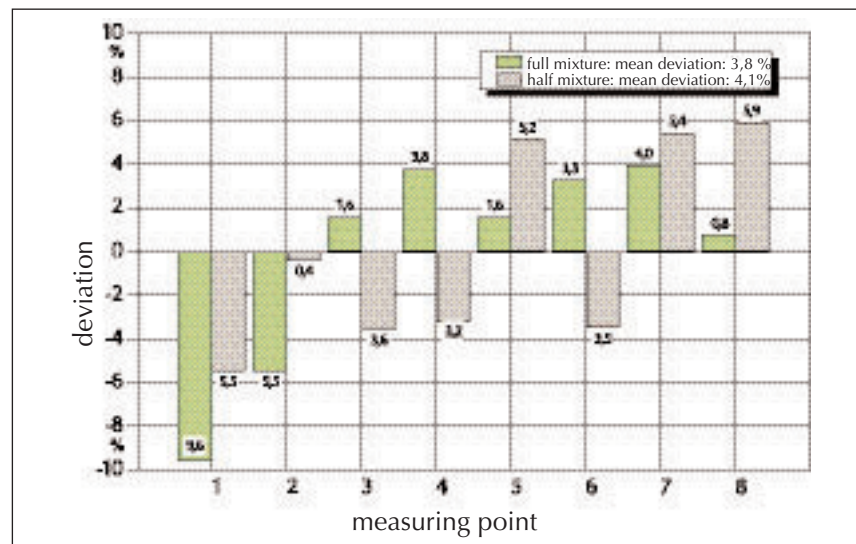
feed blocks should even be loosened first. Even if moist and structurally weak components are present, the feed is mixed very gently. Mashing can be excluded even after longer mixing times.

Long, uncut hay and straw should be added and processed only in small quantities. We found that an excessive share of uncut feed had an unfavourable effect on the mix-

ture. Longer components can wrap around the agitator shaft. Therefore, long material should only be mixed in portion-wise and in the in the correct ratio. It is impossible to add entire uncut round bales. Smaller, highly compressed bales, however, can be thrown in as a whole without causing any problems. If the components are added in the right order, this helps considerably to reduce the mixing time and to improve mixing accuracy. At the end of the filling process, even feed distribution over the entire length of the container also exerts a favourable effect on the mixing result.

**Weighing**

Three weighing sensors connect the container of the PA 15 R to the vehicle frame. Even when the wagon is parked, weighing is possible if the wagon is equipped with additional electricity supply (battery). During the filling process, the wagon should be as level as possible. While the agitator shaft was rotating, the weight displayed during filling fluctuated by up to 30 kg. The accuracy of weight measurement is dependent on the filling weight. At the minimum quantity of 100 kg and maximum load, we



**Bild 2: Deviations during the mixing of chopped grass/corn -full/half;**

mean deviation:	3.8/4.1 %.	
mixture:	3020/1,400 kg;	dM 33.6/33.2 %
Grass silage:	1700/830 kg;	dM 37.9/36.8 %
Corn silage	1320/570 kg;	dM 28.0/28.0 %

measured deviations of 4 % and <1 %, respectively.

The weighing computer is attached to the front side of the container on the left side of the wagon and can be swivelled. The casing can be swivelled to the front and the left side. Thus, the weight display is visible from the driver's seat and the left side. The electronic remote control of the ProFeed weighing computer has proved very advantageous because it enables the different programs to be set from the driver's seat. The display is illuminated, and the red, 57 mm large LED digits can be discerned very well even from larger distances.

## Feed Dispensing

At times, feed is dispensed in bouts. After a certain familiarization time, however, it is possible to dispense feed quite satisfactorily over the entire dispensing distance. In contrast to mixing, this requires the faster PTO speed of 540 min<sup>-1</sup>. The spirally arranged paddles forcibly convey the feed in a longitudinal direction towards the dispensing unit. A forward inclination of the container has a positive effect. Therefore, the hydraulic cylinder which allows the mixing container to be lifted and lowered is a useful

### Overview 1: Operation

#### coupling – can be carried out quickly

- ➔ trailer coupling, coupling of the drive shaft
- ➔ connection of the electric and brake connections
- ➔ connection of the hydraulic lines
- ➔ installation of the control block in the tractor cab
- ➔ retraction of the hydraulic sustainer

#### operation of all functions – simple; easily accessible

- ➔ with the aid of a mechanical Bowden cable in the tractor cab
- ➔ electronic remote control of the weighing computer
- ➔ when the drive shaft is turned on, the agitator shaft is started
- ➔ when the hydraulic system of the tractor is turned on, the hydraulic elements are started

#### filling of the PA 15 R – possible without hindrance

- ➔ no view of the rear of the wagon
- ➔ container opening sufficiently large
- ➔ filling only from the left side
- ➔ addition of liquids from the bottom is possible

#### feed dispensing – easy to monitor

- ➔ at the front on the left side of the container, easily visible from the driver's seat
- ➔ position of the metering slide easy to control from the driver's seat due to a scale on the front side of the wagon
- ➔ finely stepped scale from 0 to 6; pointer well visible
- ➔ complete emptying impossible

feature. According to our own experience, it is disadvantageous if the mixing container is inclined towards the rear, in particular at the end of the dispensing process. The dispensed quantity must be adapted mainly by adjusting the posi-

tion of the metering slide, the driving speed, and the rotational speed. A full wagon mixture can be dispensed within three minutes. We found that the feed flow decreases significantly towards the end. It was possible that the last 500 kg required as much time as the considerably larger quantity dispensed before. Even a higher PTO speed does not enable the container to be emptied completely.

If large feed quantities are dispensed (feed dispensing once a day), feed is driven over at some places. Under these conditions, the adjustable dispensing chute proves advantageous because the feed is deposited in a very loose swath. The mixing container features a finely stepped scale for the metering slide, which ranges from 0 to 6. It is attached to the left front side of the container in the visual field of the driver so that it is well visible. In practical operation, the quantities dispensed at different slide settings were controlled by adjusting the engine speed and the driving speed.

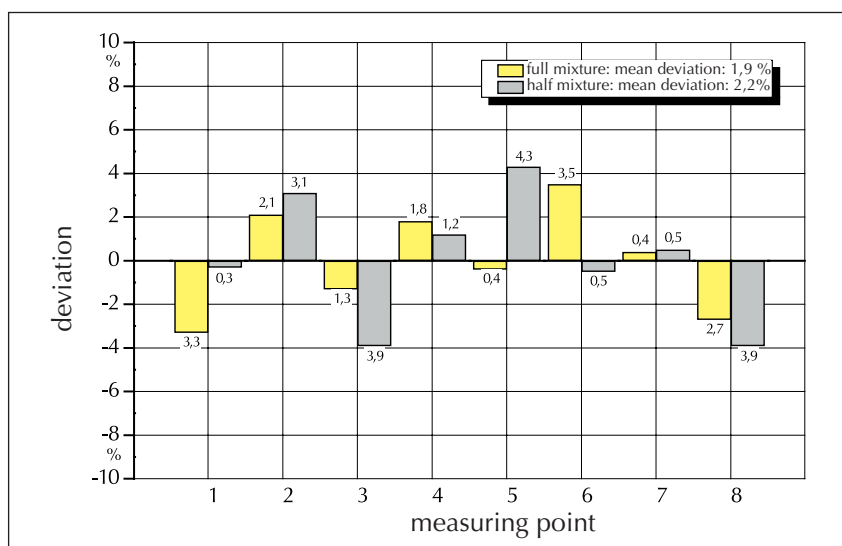


Figure 4: Deviations during the mixing of corn/pellets -full/half;

mean deviation:	1,9/2,2 %
mixture:	4730/2440 kg; TM 49,0/52,8 %
Corn silage:	4160/2030 kg; TM 43,5/45,5 %
Pellets:	570/410 kg; TM 89,0/88,7 %

Table 2; Maintenance work	Number/quantity
Lubrication points	22
freely accessible	18
can be reached while maintaining an upright posture	9
need care after ca. 10 hours	16
time required for lubrication per 100 hours of use	29 labour min

Table 3: Durability	Requirements
– of the chassis during the fatigue test on the vehicle test stand	fulfilled <sup>1)</sup>
– of the mixing- and dispensing elements during practical operation	fulfilled <sup>2)</sup>

<sup>1)</sup> After alteration by the manufacturer, the chassis was enhanced.

<sup>2)</sup> After a current total of 510 mixtures in practical operation.

**Annotation:** Chassis test according to the DLG test programme with a load of 4,000 kg and a total weight of 9,300 kg.

## Operation

For an externally filled wagon, the operation of the PA 15 R is simple, as usual. The control of the wagon with the aid of a Bowden cable is a striking feature. The control elements in the tractor cab are easy to reach from the driver's seat and comfortable to operate. However, the control block must be firmly installed at an appropriate place in the cab. At times, mounting and demounting are awkward because the stiff Bowden cables with the control valves are not easy to handle. In addition, the relatively small openings in the common tractor cabs are generally not large enough for this purpose. The electronic remote control for the weighing computer deserves praise. From the loading vehicle, one can comfortably request the different components at the touch of a button. In addition, the operator is not bound to a fixed order and can choose freely among up to 40 feeds.

## Power Requirements

The power requirements of the PA 15 R are very low. According to the operating instructions, mixing and feed dispensing require a rotational speed of 400 min<sup>-1</sup> and 540 min<sup>-1</sup>, respectively. The power requirements are mainly dependent upon feed structure and the transmission ratio of the paddle agitator drive. At a tractor PTO speed of 400 min<sup>-1</sup> and 540 min<sup>-1</sup>, the paddles rotate 6.3 times and 8.6 times, respectively. The measurement results are shown in Table 1.

## Maintenance

The maintenance requirements of the PA 15 R are very low. The service intervals for the different lubrication- and maintenance points required by the operating instructions are 10 to 40 hours. Table 2 lists the necessary maintenance work for lubrication. The operating instructions are clearly structured and provide an extensive description of work with



Figure 5: The filler neck at the rear of the mixing container allows small or liquid components to be added.

the wagon. The German translation should be revised at some places. The list of spare parts is clearly structured and good.

! Biodegradable oils can be used after consultation with the manufacturer.



Figure 6: The levers of the Bowden cable control are easy to reach from the driver's seat and comfortable to operate. However, this requires that they are firmly and stably installed at an appropriate place.

Feed components	Mixture	DM cont.	max. power requirements	specific power requirements
Loader wagon grass/corn	3400 kg	33,8 %	41 kW	7,4 kW/t
Chopped grass/corn	4940 kg	29,1 %	40 kW	6,1 kW/t
Corn/pellets	5085 kg	46,8 %	28 kW	4,5 kW/t

Table 1: Power requirements at a rotational speed of the PTO of 400 min<sup>-1</sup>

## Description and Technical Data (measured values)

### Design:

Towed feeder mixer and dispenser wagon

Rated PTO speed during mixing: 400 min<sup>-1</sup> / during feeding: 540 min<sup>-1</sup>

required hydraulic control valves on the tractor 1 single-acting, 1 free reflux, or 1 double-acting

Operation mechanical (Bowden cable)

Service brake pneumatic two-circuit brake

Permissible maximum speed 25 km/h

Sustainer hydraulic

### Container

Container volume 15 m<sup>3</sup>

Capacity 12 m<sup>3</sup>

Opening on top, length x width 4110 mm x 1870 mm

Thickness and kind of material Side wall: 6 mm, S 500 MC / Tub: 6 mm, St 37

### Mixing system

Paddle agitator 9, with exchangeable rubber scrapers, chain drive, clockwise rotation

rotational speed (at 400/540 min<sup>-1</sup>) 6,3/8,6 min<sup>-1</sup>

chain transmission 63:1

straw knives 8

### Weighing system

ProFeed; Display swivellable; illuminated

digit height 57 mm

storable mixing programmes 10

mögl. Komponenten beim Beladen/

possible components during loading/portions during dispensing 20

set quantity display none

number of weighing sensors 3

weighing during filling yes

### Dispensing technology

lateral, fixed chute with a dispenser roller

road clearance 250 mm, adjustable

dispensing opening, width x height 915 mm x 700 mm

metering slide hydraulically operated

### Lubrication oil, capacities

chain transmission, SAE 80W – 90W 4,5 litres

### Special equipment (tested)

wide-angle drive shaft, Bowden cable operation, hydraulic sustainer, pneumatic brake system, rubber scrapers, ProFeed weighing computer, approved according to StVZO.

### Special equipment (not tested)

feed dispensing on both sides, different elevator models, wireless data transmission from the ProFeed weighing computer

### Main measurements and weights

Length: 6500 mm; Width: 2365 mm; Height, in transport-/work position: 2790 mm

Mounting: type, clearance: trailer hitch, 850 mm

Tyres Continental 385/65 R 22.5

Track width 1740 mm

Overall track measurements at the indicated tyre size 2125 mm

Ground clearance 195 mm

Permissible total weight 9840 kg

Empty weight 5220 kg

Payload 4600 kg

Permissible tongue load 1570 kg

## Survey Result

In a survey, eight farms were asked about their experiences during practical operation. The oldest wagon had been used for three years.

All our results were confirmed by the farmers. They primarily processed chopped material and, in some cases, loader wagon grass and even round bales. The very low power requirements were given the best possible rating. Complete mixing generally required approximately 15 to 20 min. All farmers were satisfied with the mixing result. Feed dispensing was criticized by everyone. After a certain habitua-

tion time, however, all farmers were able to cope with it. In some cases, those surveyed complained about incomplete emptying of the container. However, this did not bother the majority of the farmers. Two farms criticized that the rubber plates of the paddles were broken off.

All farmers questioned were satisfied with the wagon and would buy it again.

## Work Safety

The feed mixer and dispenser wagon PA 15 R was evaluated by the German Test Station for Agricul-

tural and Forestry Machinery (DPLF). Under the aspect of work safety technology, there are no objections to the use of this wagon.

## Traffic Safety

The tested version of the PA 15 R was equipped with a pneumatic two-circuit braking system. Type approval according to § 18 (5) StVZO (German Motor Vehicle Safety Regulations) has been granted. During road rides, one must make sure that the maximum speed of 25 km/h and the permissible total weight of 9,840 kg are not exceeded.

## Test

The test was carried out according to the DLG Test Frame for feed mixer and dispenser wagons. For the test, a feeder mixer wagon was available during the 2001 feeding season.

During the test, a total of 510 loads with altogether approximately 1,670 t of feed were mixed and dispensed. Under our test conditions, the maximum load was 5,085 kg, which meant that the indicated payload was exceeded by 8 %.

## Testing

DLG Test Station for Agricultural Machinery, Max-Eyth-Weg 1, 64823 Groß-Umstadt

12/2002  
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## Measuring operation

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Betriebsgemeinschaft  
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Birkenhof, Großostheim

## Practical operation

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