व्यावसायिक परीक्षण रिपोर्ट (प्रथम बैच परीक्षण रिपोर्ट) संख्या / No. : T-1467/1994/2020 COMMERCIAL TEST REPORT (First Batch Test) माह / Month : August, 2020

(यह परीक्षण रिपोर्ट 31/08/2025 तक वैद्य है। / THIS TEST REPORT IS VALID UP TO : 31/08/2025)



## MAHINDRA, 605 DI i TRACTOR (Brand Name : Arjun Novo)



भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय

कृषि, सहकारिता एवं किसान कल्याण विभाग मशीनीकरण एवं प्रौद्योगिकी प्रभाग

# GOVERNMENT OF INDIA MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(Department of Agriculture, Cooperation & Farmers Welfare, Mechanization & Technology Division) केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

# CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE (An ISO: 9001 - 2015 Certified Institute)

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# MAHINDRA, 605 DI i (Brand Name : Arjun Novo) TRACTOR - Commercial (First Batch Test)

### (THIS TEST REPORT IS VALID UPTO 31/08/2025)

### 1. SPECIFICATIONS

1.1 Tractor:

Make : Mahindra
Model : 605 DI i
Brand name : Arjun Novo
Variant, if any : None

Type : Four wheeled, Rear wheel drive, Unit

construction, General purpose,

Agricultural tractor.

Year of manufacture : FK

Chassis number : MBNWHBEMEKNF03732

Country of origin : India

1.2 Engine:

Make : Mahindra Model : MSI457 3A

Type : Four stroke, naturally aspirated, water

cooled, direct injection, diesel engine.

Serial number : NKE2WDE0270

Year of manufacture : NA

1.2.1 Engine speed (rpm), (Manufacturer's recommended production settings):

Maximum speed at no load
Low idle speed
Speed at maximum torque
2400 to 2500
750 to 850
1100 to 1300

Rated speed, (rpm):

- For PTO use : 2100 - For drawbar use : 2100

1.3 Cylinder & Cylinder Head:

Number : Four

Disposition : Vertical, Inline Bore/stroke, (mm) : 96/122 (apa)

Capacity as specified by the : 3531

applicant, (cc)

Compression ratio :  $18.3(\pm 0.5):1$ Type of cylinder head : Monoblock Type of cylinder liners : Wet, replaceable

Type of combustion chamber : Re-entrant bowl cavity on piston top

Arrangement of valves : Overhead, inline

Valve clearance (cold/hot):

Inlet valve, (mm)Exhaust valve, (mm)0.3/0.40.3/0.4

1.4 Fuel System:

Type of fuel feed system : Gravity and force feed

# MAHINDRA, 605 DI i (Brand Name : Arjun Novo) TRACTOR - Commercial (First Batch Test) (THIS TEST REPORT IS VALID UPTO 31/08/2025)

### 17. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

17.1 On the basis of tests conducted the performance results have been summarized as evaluative (mandatory) and non-evaluative (not-mandatory) parameter applicable for qualifying Minimum Performance Criteria as per Clause-4 (Table-1) of IS: 12207-2019 for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

SI. No.		Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207- 2019	Values declared by the applicant/ (D) Requirement (R)	As observe d	Whether meets the require- ments (Yes/No)
1		2	3	4	5	6	7
17.1.1	PTC	Performance :					
a)	2 h t (Nat	power under test, (kW ) tural ambient dition)	Evaluativ e	Declared value to be achieved with a tolerance of: ± 5% for PTO power or engine power >26 kW, ± 10% for PTO power or Engine power ≤ 26 kW.	37.5 (D)	37.5	Yes
b)		rer at rated ine speed, (kW)	Non Evaluativ e	-do-	37.5 (D)	37.5	Yes
c)	corr	sumption esponding to imum power,	Evaluativ e	+ 10% Max.	251 (D)	248	Yes
d)	equi cran (Nm		Non Evaluativ e	± 8%	199.8 (D)	205.6	Yes
e)	Back	k-up torque, cent	Evaluativ e	12 percent, min.	18 (D) 12 (R)	20.7	Yes
f)		imum operating t	emperature( <sup>c</sup>	PC)	· /		
	1)	Engine oil	Evaluativ e	The declared value should not exceed the max. value specified by the oil company and the observed value under high ambient condition should not exceed the declaration.	130 (D)	126	Yes
	2)	Coolant (liquid)	Evaluativ e	The declared value should not exceed the boiling temperature of coolant under the pressurized or otherwise and the observed value under high ambient condition should not exceed the declaration.	119 (D)	105	Yes
g)	Engine oil consumption,(g/kWh)		Evaluativ e	Not exceeding 1% of SFC at max. power under High ambient conditions	2.50 (R) Maximum	0.74	Yes
h)	Smo	ke level, (m <sup>-1</sup> )	Evaluativ e	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hat ridge value (As per CMVR)	3.25 (R)	0.27	Yes

1	2	3	4	5	6	7
17.1.2	Drawbar performanc	e:	,			
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass with ballast	21.16 (D) 22.41 (R) Minimum	27.03	Yes
b)	Maximum drawbar pull without ballast/ with standard ballast		Minimum 70% of static mass of tractor without/ standard ballast	16.20 (D)	19.30	Yes
	corresponding to 15 percent wheel slip, (kN)			17.02 (R) Minimum		
c)	Maximum drawbar power without ballast/ with standard ballast as the case may be, kW		Minimum 80 % of PTO power as referred in SI No. i) a) of PTO performance in case of tractors having total static mass > 1500 kg Minimum 75 % of PTO power as referred in SI No. i) a) of PTO performance in case of light weight tractors having 1500 kg total static mass of tractor Minimum 75 % of the engine power as referred in SI No. i) a) of engine performance in case of tractors which do not have a PTO shaft.	30.0 (D) 30.0 (R) Minimum	32.6	Yes
d)	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company.	110 (D)	84	Yes
17.1.3	Power lift and hydrau	ilic pump perf				
a)	Maximum lifting capac	ity throughout t	he range of lift, (kN):			
	At hitch points	Evaluative	±10 percent	22.0 (D)	23.55	Yes
	2) With the standard frame	Evaluative	The lift capacity should at least be 24 kg/PTO kW. and it should be 21.5 kg/engine kW where the tractor is not provided with a PTO shaft.	8.83 Minimum (R)	13.70	Yes
b)	Maximum drop in the height of the point of application of the force after each 5 minutes interval for a total duration of 30 minute, (mm)	Evaluative	The observed value should not exceed 50 mm	50 (D) 50 (R) Maximum	20	Yes
17.1.4	Brake performance a				1.1	
a)		stance at a for	ce equal to or less than 600 N	N on brake p	edal with	road
	ballast, (m):  1) Cold brake  2) Hot brake	Evaluative Evaluative	10 10	10 (R) 10 (R)	7.58 7.88	Yes Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s <sup>2</sup> (N)	Evaluative	600	600 (R)	304 to 352	Yes

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1		2	3	4	5	6	7
c)	Whe	ether parking					
	at a	te is effective force of 600 N	Evaluativ	Yes / No	Yes (R)	253 to	Yes
	at foot pedal(s) or 400 N at hand lever, N		е		,	301	
17.1.5		se measurement	t :				
a)		imum ambient					
,	nois the	e emitted by tractor dB(A)	Evaluativ e	As per CMVR	88 (R)	83	Yes
b)		rator's ear level	Evaluativ e	As per CMVR	96 (R)	94	Yes
17.1.6	Am	plitude of mecha	anical vibrat	ions at :			
	1)	Left foot rest		100 microns (max)		31	Yes
	2)	Right foot rest	Non Evaluative	-do-	100 (R)	28	Yes
	3)	Seat (with driver seated)		-do-		73	Yes
	4)	Steering wheel		do-		32	Yes
17.1.7	Air cleaner oil pull over :						
		rimum air ner oil pull over	Evaluative	0.25 % (max.)	0.25 % (max.)	Dry type air cleaner is provided	Not appli- cable
17.1.8		lage requiremen					
a)		ss mass of the tr			T		
	1)	Two wheel	Non	As specified by	5.0 (D)	5.0	Yes
	2)	Four wheel	Evaluative	the manufacturer	8.0 (D)	8.0	Yes
b)				onsumption, (km/l):		T = =	
	1)	Two wheel	Non	As specified by	3 to 6 (D)	5.41 to 5.44	Yes
>	2)	Four wheel	Evaluative	the manufacturer	3 to 6 (D)	4.95	Yes
c)		l consumption (n			100 to 45 (D)	00 75 to 00 00	Vaa
	1) 2)	Two wheel	Non	As specified by	30 to 45 (D)	36.75 to 36.99	
47.4.0		Four wheel	Evaluative	the manufacturer	30 to 45 (D)	25.24 to 25.27	No
17.1.9	Sea	land cultivation ling for the		The identified			
	follo	wing for the wing emblies:	Evaluative	assemblies should essentially meet			
	1)	Clutch assembly	-do-	the requirement of IS: 11082. No water ingress in	There		
	2)	Brake	-do-	the identified	should be	No ingress	
		housings		assembly given in	no ingress	of water	
	3)	Front axle hubs	-do-	column-2.  If tractor does not meet the	of water and / or	and/or mud was	Yes
	4)		-do-	requirements of wetland cultivation,	mud (R)	observed.	
	5)	Transmissi on Oil	-do-	it may be recommended for dry land operation only.			

1	2	3	4	5	6	7
17.1.10	Safety features :					
a)	Guards agains moving and hoparts		Belt drives silencer, pipes(as pe Part 2)	hydraulics r IS-12239	Meet the requirements	Yes
b)	Lighting arrangement	Evaluative	As per CMV	'R	Meet the requirements	Yes
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Evaluative	Should n requirement 12343 (As from time to	amended	Does not meet the requirements	No
d)	Technical requirements for PTO shaft		requirement 4931 (As from time to	amended time)	Meet the requirements	Yes
e)	Dimensions of three point linkage	_	requirement	ırt-I) (As	Does not meet the requirements	No
f)	Specifications of linkage drawbar	Evaluative	Should n requirement 12953 (As from time to	amended	Meet the requirements	Yes
g)	Specifications of Swinging drawbar (wherever fitted)	Evaluative	Should n requirement 12362 (Pa amended fro time)	rt 3) (As	Not provided	Not appli- cable
h)	1) Maximum travelling speed a rated engine speed ir reverse gears, kmph		Should not Kmph		(18.01 kmph) Meet the requirements	Yes
	2) Audible warning signal on tractor.	Evaluative	As soon as t speed in re- reaches to 2 audible warrin tractor be ac safety aspect operation technology brought in op- manufacturer ensure the tra- aspect to ope the delivery of	everse gear 0 kmph, and signal on ctivated, The is about the of shuttle shall be peration and dealer shall tining on this erator before	Not applicable	Not appli- cable

1	2	3	4	5	6	7
17.1.11	Labelling of tractors	(Provision of	labelling plat	e):		
	1) Make	Evaluative		nform to	Mahindra	Yes
	2) Model	Evaluative	the require		605 DI i	Yes
	3) Month & Year of manufacture	Evaluative		llong-with alue of	FK	No
	4) Engine number	Evaluative	PTO in kW of manufa		NKE2WDE0 270	Yes
	5) Chassis number	Evaluative	numerical MM	YY	MBNWHBEME KNF03732	Yes
	6) Declaration of PTO power, kW	Evaluative	Digit 01-12 No.1 for	2 in box MM will	37.5	Yes
	7) Specific fuel consumption (g/kWh)	Evaluative	represent the and next two the box No. will represent year manufacturing	o digit in 2 for YY ent the of	251	Yes
17.1.12	Discard limit for:			3		
(a)	Cylinder bore diameter, (mm)	Evaluative	To be	96.522	96.00 to 96.01	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	specified by Manufacturer	0.50	0.110 to 0.112	Yes
(c)	Piston diameter at skirt, mm	Non Evaluative		95.600	95.898 to 95.900	Yes
(d)	Ring end gap (mm):					
, ,	- Top comp. ring.		-do-	2.5	0.35 to 0.40	Yes
	- 2 <sup>nd</sup> comp. ring.	Evaluative	-do-	2.5	0.90	Yes
	- Oil ring.		-do-	2.0	0.35	Yes
(e)	Ring groove clearand	ce (mm):				
	- Top comp. ring.	Evaluative	-do-	0.30	Tapered ring	
	- 2 <sup>nd</sup> comp. ring.	-do-	-do-	0.30	0.056 to 0.063	Yes
	- Oil ring.	-do-	-do-	0.25	0.050 to 0.058	Yes
(f)	Clearance of main en					
	- Diametrical	Evaluative	-do-	0.30	0.062 to 0.083	Yes
	<ul> <li>Crank shaft end float</li> </ul>	Evaluative	-do-	0.90	0.12	Yes
(g)	Clearance of big end	bearings, (mr	n):			
	- Diametrical	Evaluative	-do-	0.20	0.063 to 0.092	Yes
	- Axial	Evaluative	-do-	0.75	0.25	Yes
(h)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.20	0.096 to 0.110	Yes
(i)	Clearance between center pin and bush,(mm)	Non Evaluative	-do-	0.20	0.088 to 0.110	Yes

1	2	3	4	5	6	7	
17.1.13	Literature (Submission						
(a)	Operator manual	Evaluativ e	Provided / Not Provided	Provided	Provided	Yes	
(b)	Parts Catalogue	Evaluativ e	Provided / Not Provided	Provided	Provided	Yes	
(c)	Workshop/ Service manual	Evaluativ e	Provided / Not Provided	Provided	Provided	Yes	
17.1.14	Fitment of Roll Over Protective Structure (ROPS): for tractors having more than 1150 mm rear track width	Evaluativ e	ROPS should meet the requirement of IS:11821 or OECD code or equivalent International Standard	Provided	Not fitted	Not appli- cable	
17.1.15	Standard accessories	Evaluativ e	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes	
17.1.16	Accessories (Optional)	Non Evaluativ e	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Provided	Yes	
17.2	CATEGORY OF BREAKDOWNS / DEFECTS :(As per clause 5.0 of IS-12207-2019)						
S. No.	Category of Breakdown	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019		As observed	Whether meets the require- ment (Yes/No)	
1.	Critical breakdown	Evaluativ e	There is no 'critical breakdown' during the course of testing.		None	Yes	
2.	Major breakdowns	Evaluativ e	There are not more than 1 major breakdowns and neither of them is of repetitive nature.		None	Yes	
3.	Minor breakdowns	Evaluativ e	There are not more than 3 minor defects during the test and the frequency of each is not be more than two.		None	Yes	
4.	Total breakdowns	Evaluativ e	In no case, the total number of breakdowns should exceed four that is, (1 major + 3 minor) or 4 minor breakdowns.		None	Yes	

# MAHINDRA, 605 DI i (Brand Name : Arjun Novo) TRACTOR - Commercial (First Batch Test) (THIS TEST REPORT IS VALID UPTO 31/08/2025)

#### 17.3 Salient Observations:

### 17.3.1 Laboratory tests:

#### 17.3.1.1 PTO Performance Test:

- The maximum PTO power was recorded as 36.5 kW and 37.5 kW in case of previous and present tested samples respectively against the declaration of 37.5 kW.
- ii) The specific fuel consumption corresponding to maximum power was recorded as 248 g/kWh and 248 g/kWh in case of previous and present tested samples respectively against the declaration of 251 g/kWh.
- iii) The maximum equivalent crankshaft torque was recorded as **205.6 Nm** against the declaration of **199.8 Nm**.
- iv) The backup torque was observed 20.7%.
- v) The maximum PTO power drop of **5.3** % was observed during natural to high ambient conditions. This should be looked into for necessary corrective action.

### 17.3.1.2 Hydraulic performance test:

- i) The moment about rear axle with standard frame was calculated as 21.24 kN-m and the moment about front axle was calculated as 19.19 kN-m. The moment about rear axle is on higher side as compared to the moment about front axle. It is, therefore, recommended that the lifting capacity of the hydraulic system may be reduced or suitable standard ballast may be provided to avoid the front lifting of the tractor.
- ii) The lifting capacity at hitch point was recorded as 23.55 kN which is 96.8 % of total mass of standard ballasted tractor & considered very high & may result in overturning of tractor. Keeping in view the safe operation of the tractor, it should be reduced suitably.

### 17.3.1.3 Brake performance:

The maximum stopping distance at 25 kmph speed of tractor was recorded as **6.90 meters** and **7.58 meters** in case of previous and present tested samples respectively. The brake performance of the present sample is found deteriorated and calls for improvement keeping in view the safety aspects.

### 17.3.1.4 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (\*) in **Chapter - 8** of this test report is on higher side. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

### 17.3.1.5 Haulage Test:

i) The specific fuel consumption (ml/km/ton) in four wheel trailer was recorded as 25.24 to 25.27 ml/km/ton, against the declaration of 30 to 45 ml/km/ton, which does not meet the requirement of IS: 12207-2019 with regard to tolerance. This should be looked into for necessary corrective action.

### 17.3.1.6 Three point linkage:

The parameters of width of ball of lower hitch pin hole & lateral distance from lower hitch point to centre line of tractor does not meet the minimum requirement and some of the parameters conform to Cat. I and some of them conform to Cat. II. Keeping in view the spirit of standardization, necessary improvement may be incorporated.

# MAHINDRA, 605 DI i (Brand Name : Arjun Novo) TRACTOR - Commercial (First Batch Test) (THIS TEST REPORT IS VALID UPTO 31/08/2025)

#### 17.3.1.7 PTO master shield:

The parameter of PTO master shield "n" does not meet the requirement of IS: 4931-1995. This should be looked into for necessary corrective action.

#### 17.3.1.8 Operator's seat:

The longitudinal distance from Seat Index Point to centre of differential lock pedal does not meet the requirement of IS: 12343-1998. This should be looked into for necessary corrective action.

#### 17.3.1.9 Labelling plate:

The month & year of manufacture embossed on the labelling plate as 'FK' and does not meet the evaluative requirement as per IS: 12207-2019. As per IS: 12207-2019, it should be in numerical form on the labeling plate. This should be looked into for necessary corrective action.

#### 17.3.1.10 Field performance:

### 17.3.1.10.1 Wetland operation (Puddling operation):

No ingress of water and or mud in various assemblies/components was noticed during wetland cultivation of tractor. Hence, it meets the requirements of IS: 11082-1984 (Technical Requirements of Agricultural Tractors for Wetland Operation). The tractor is found suitable for wetland operation (Puddling).

#### 17.4 Maintenance / Service Problems:

No noticeable maintenance or service problems were observed during the test.

### 17.5 Recommendation with regard to safety on tractor:

The following requirements, inter alia, may be considered for incorporation on the tractor:

- i) Provision of spark arrester in the exhaust system.
- **ii)** The working clearance between the draft control lever and position control lever should be provided as per the requirement of relevant Indian Standard.
- iii) Fuel shut-off knob should remain in "STOP" position.
- **iv)** Grease lubricant, oil lubricant type and frequency chart be provided as per relevant standard.
- Vertical retainness at both sides of pedals should be provided as per relevant standard.

### 17.6 Adequacy of Literature supplied with machine:

- 17.6.1 The following literatures were supplied with the test tractor for reference during the test:
  - a) Operator's manual of Mahindra 605 DI i Tractor model
  - b) Parts Catalogue of Mahindra 605 DI i Tractor model
  - c) Service manual of Mahindra 605 DI i Tractor model
- **17.6.2** However, these literatures should be brought out in other vernacular languages of India for guidance of users.

## MAHINDRA, 605 DI i (Brand Name : Arjun Novo) TRACTOR - Commercial (First Batch Test)

(THIS TEST REPORT IS VALID UPTO 31/08/2025)

## 18. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of Test	Whether the Test Report is released within the time frame given in Citizen Charter	Remarks
10 Months	08 Months (November, 2019 to June, 2020)	Yes	

**TESTING AUTHORITY:** 

SHWETABH SINGH AGRICULTURAL ENGINEER C.V. CHIMOTE TEST ENGINEER

J.J.R. NARWARE DIRECTOR

The report compiled by: Shri Vithato Keyho, Senior Technical Assistant

### 19. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
19.1	17.1.11(3) & 17.3.1.9	We will implement the new lebelling plate (MMYY numerical form) on regular production of subject model w.e.f. 01.09.2020.
19.2	17.3.1.4, 17.3.1.6, 17.3.1.8, & 17.5 (ii, iii, iv & v)	Observation will be studied, and necessary action will be incorporated.
19.3	17.6.2	Literatures are available in all language of india.

# MAHINDRA, 605 DI i (Brand Name : Arjun Novo) TRACTOR - Commercial (First Batch Test) (THIS TEST REPORT IS VALID UPTO 31/08/2025)

## ANNEXURE - I

### BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	l t e m	Disc Plough	Rotavator
1.	Make	Mahindra	Field king
2.	Туре	Mounted	Mounted
3.	No. of bottom / blades/discs	03	42 in 7 flanges
4.	Type of bottom / blades/blades	Concave	Hatchet
5.	Size of bottom / blade/disc, (mm)	660	280 x 85 x 7
6.	Spacing of bottom/flanges/bracket, (mm)	505	245
7.	Lower hitch point span, (mm)	780	800
8.	Mast height, (mm)	460	605
9.	Overall dimensions, (mm):		
	- Length	1950	1100
	- Width	1340	2020
	- Height	1190	1150
10.	Gross mass, (kg)	355	445

### <u>ANNEXURE – II</u>

### **BRIEF SPECIFICATION OF CAGE WHEEL**

S. No.	Parameters	Specifications
1.	Туре	Full cage wheel
2.	Dia, (mm)	1280
3.	Width, (mm)	850
4.	No. and types of lugs	24, Straight lugs made of M.S. angle section welded to angle iron frame
5.	Size of angle section, (mm)	50 x 50 x 6
6.	Length of lugs, (mm)	425
7.	Spacing of lugs, (mm)	160
8.	Weight of each cage wheels (kg)	145

### **ANNEXURE- III**

### **TRACTOR RUN HOURS DURING TEST**

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	
2.	PTO performance test	11.62
3.	Power lift and hydraulic pump performance test	1.0
4.	Drawbar performance test	17.36
5.	Turning ability	0.50
6.	Location of centre of gravity	0.25
7.	Operator's field of vision	
8.	Brake test	1.75
9.	Noise measurement	1.0
10.	Mechanical vibration test	1.0
11.	Nominal speed test	0.89
B.	FIELD TEST:	
1.	Disc ploughing	10.50
2.	Rotavation	10.59
3.	Wetland cultivation (including water proof)	15.08
C.	HAULAGE TEST:	4.69
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	19.48
	TOTAL:	95.71

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