

ब्यावसायिक परीक्षण रिपोर्ट (प्रारंभिक)
COMMERCIAL TEST REPORT (Initial)

संख्या / No. : T-1017/1541/2016
माह / Month : March, 2016



MAHINDRA, YUVO 265 DI TRACTOR



सत्यमेव जयते

भारत सरकार

कृषि एवं किसान कल्याण मंत्रालय
(कृषि, सहकारिता एवं किसान कल्याण विभाग)

GOVERNMENT OF INDIA

MINISTRY OF AGRICULTURE AND FARMERS WELFARE

(DEPARTMENT OF AGRICULTURE, CO-OPERATION AND FARMERS WELFARE)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) ४६६ ४४५

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO : 9001 - 2008 Certified Institute)

Tractor Nagar, Budni (M.P.) 466 445

E-mail fmti-mp@nic.in

Website : <http://cfmtti.dacnet.nic.in>

Telephone : 07564 - 234729

Fax : 07564 - 234743

Address of Manufacturer

- : Mahindra & Mahindra Ltd.
(Farm Equipment Sector)
- : 1. MahindraResearch Valley-AS,
Mahindra World City, Plot No. 41/1, Anjur
P.O.: Chengalpattu- Kanchipuram district
- 603004
 - : 2. Akurli Road, Kandivli (E)
Mumbai - 400 101
 - : 3. Hingna Road, Hingna MIDC
Nagpur- 440 016.
 - : 4. Agri Business Development Center,
Khatima Panipat Highway, Udham Singh
Nagar, Vil. Lalpur, Tehsil-Kichha,
Rudrapur - 263 153
 - : 5. Agri Development Center, Vil-Mehla
Tehsil - Dudu Jaipur- Ajmer Road,
Jaipur- 303 007
 - : 6. Near Bidar "T" Junction , Mahindra
Nagar,Zaheerabad- 502 220
Medak District, Telangana

Test requested by (applicant)

- : Mahindra & Mahindra Ltd.(FES), Akurli Road,
Kandivli (E)
Mumbai - 400 101
- : At applicant's works

Place of running-in

Duration of said running-in (h):

- Engine

- Transmission

Method of Selection

- : 30 hrs and 2 min.
- : 39 hrs
- : The tractor was submitted directly by the
applicant for test. Hence, method of selection
is not known.

1. SPECIFICATIONS

1.1 Tractor:

- Make : Mahindra
- Model : YUVO 265 DI
- Brand Name : None

Optional feature provided during ICT

Optional feature	Additional test carried out
Different tyre sizes 1. One step upper i.e. 13.6-28,12 PR)	Physical Inspection and Nominal Speed test

Variants, if any :

Mahindra YUVO 275 DI

- : PTO power 23.17 kW (more than 10% in
declared value) with 13.6-28, 12 PR Tyre

* As declared by the Manufacturer, not to be tested at this Institute.

Type

- : Four wheeled, rear wheel drive unit
construction general purpose Agricultural
Tractor.

Year of manufacture

- : FE (i.e. September, 2014)

Chassis serial number

- : ZGDA 00016

Country of origin

- : India



16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 Evaluative (mandatory) / Non-evaluation (Non-mandatory) parameter applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2014 for acceptance of the tractor for the purpose of subsidies/NABARD financing are summarized as under:

Sl. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	Values declared by the applicant (D) / Requirement (R)	As observed	Whether meets the requirements (Yes/No)
1	2	3	4	5	6	7
16.1.1 PTO Performance :						
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >26 kW. - 7.5/+10% for PTO power ≤ 26 kW or -5 / +10% for Engine power >26 kW. - 7.5/+10% for Engine power ≤ 26 kW	20.37 (D)	20.5	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	20.37 (D)	20.5	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+ 5%	243 (D)	246	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	128 (D)	117.62	No
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	23 (D)	19.87	Yes
f) Maximum operating temperature, (°C)						
1)	Engine oil	Non Evaluative	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)	102	Yes
2)	Coolant	Evaluative	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.	112 (D)	89	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.43 (D) 2.48 (R)	0.36	Yes
h)	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	0.50 per meter (D) 3.25 per meter (R)	0.32	Yes



1	2	3	4	5	6	7
16.1.2 Drawbar performance (Supplementary Test):						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 65% of static mass with ballast	17.67 (D) 15.97 (R)	17.83	Yes
b)	Max. drawbar pull With Standard ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 65% of static mass of tractor without ballast	12.47 (D) 12.53 (R)	14.34	Yes
c)	Maximum drawbar power With Standard ballast (kW).	Evaluative	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.	16.3 (D) 16.4 (R)	17.7	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	78	Yes
16.1.3 Power lift and hydraulic pump performance :						
a)	Maximum lifting capacity throughout the range of lift, (kN):					
	1) At hitch points	Non Evaluative	[Tolerance of minus 10%]	14.70 (D)	18.0	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	11.77 (D) 4.82 (R)	12.50	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 Minutes, (mm)	Non Evaluative	Observed value should not exceed 50 mm.	50 (D)	05	Yes
16.1.4 Brake performance at 25 kmph:						
a)	Maximum stopping distance at a force, equal to or less than 600 N on brake pedal with road ballast, (m):					
	1) Cold brake	Evaluative	10	10 (R)	7.58	Yes
	2) Hot brake	Evaluative	10	10 (R)	7.61	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R)	124 to 156	Yes

initial)

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licable for 07-2014 for summarized

Whether meets the requirements (Yes/No)

7

Yes

Yes

Yes

No

Yes

Yes

Yes

Yes

Yes



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1	2	3	4	5	6	7
16.1.5 Noise measurement :						
a)	Maximum ambient noise emitted by the tractor dB(A)	Evaluative	As per CMVR	88 (R)	80	Yes
b)	Maximum noise at operator's ear level dB(A)	Evaluative	As per CMVR	96 (R)	91	Yes
16.1.6 Amplitude of mechanical vibrations at :						
1)	Left foot rest	Non Evaluative	100 microns (max)	100 (R)	70	Yes
2)	Right foot rest				90	Yes
3)	Seat (with driver seated)				110	No
4)	Steering Wheel				60	Yes
16.1.7 Haulage requirements :						
a) Gross mass of the trailers, (tones):						
1)	Two wheel	Non	--	5.0	5.0	Yes
2)	Four wheel	Evaluative	--	6.0	6.0	Yes
b) Distance travelled / litre of fuel consumption, (km/l):						
1)	Two wheel	Non	--	4 to 5	5.55 to 5.86	Yes
2)	Four wheel	Evaluative	--	4 to 5	5.40 to 6.03	Yes
c) Fuel consumption (ml/km/tonne):						
1)	Two wheel	Non Evaluative	--	25 to 30	27.60 to 30.83	No
2)	Four wheel		--	25 to 30	34.11 to 36.02	No
16.1.8 Wetland cultivation :						
Sealing for the following assemblies:		Evaluative	The identified assemblies should essentially meet the requirement of IS: 11082. No water ingress in the identified assembly given in column-2. If tractor does not meet the requirements of wetland cultivation, it may be recommended for dry land operation only.	There should be no ingress of water and/or mud	No ingress of mud and / or water was observed	Yes
1)	Clutch assembly					
2)	Brake housings					
3)	Front axle hubs					
4)	Engine oil					
5)	Transmission oil					
16.1.9 Safety features :						
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes	--	Provided	--
b)	Lighting arrangement	Evaluative	As per CMVR	--	Provided	Yes
16.1.10 Labelling of tractors (Provision of labelling plate):						
1)	Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO HP	--	Mahindra	Yes
2)	Model	Evaluative		--	YUVO 265 DI	Yes
3)	Year of manufacture	Evaluative		--	FE	Yes
4)	Engine number	Evaluative		--	ZGDA 00016	Yes
5)	Chassis number	Evaluative		--	ZGDA 00016	Yes
6)	Declaration of PTO power, kW (hp)	Evaluative		--	20.37	Yes



tial)
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1	2	3	4	5	6	7
16.1.11	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer	89.13 (D)	88.89 to 88.91	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.20 (D)	0.050 to 0.075	Yes
(C)	Ring end gap (mm):					
	- Top comp ring.	Evaluative	-do-	2.50	0.30 to 0.40	Yes
	- 2 nd comp ring.		-do-	2.50	0.30 to 0.40	Yes
	- Oil ring.		-do-	2.00	0.33 to 0.40	Yes
(d)	Ring groove clearance (mm):					
	- Top comp ring.	Evaluative	-do-	Taper Rings	--	--
	- 2 nd comp ring.		-do-	0.30	0.073 to 0.082	Yes
	- Oil ring.		-do-	0.20	0.032 to 0.040	Yes
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	To be specified by the manufacturer	0.20	0.062 to 0.086	Yes
	- Crankshaft end float	Evaluative		0.60	0.20	Yes
(f)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.20	0.025 to 0.070	Yes
	- Axial	Evaluative	-do-	0.75	0.25	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	0.30	0.043 to 0.129	Yes
(h)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	0.30	0.029 to 0.046	Yes

16.1.12 CATEGORY OF BREAKDOWNS / DEFECTS :					
S. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2008	As observed.	Whether meets the requirements (Yes/No)
1.	Critical	Evaluative	No critical breakdown	None	Yes
2.	Major	Evaluative	Not more than two and neither of them should be repetitive in nature	None	Yes
3.	Minor	Evaluative	Not more than five and frequency of each should not be more than two.	None	Yes
4.	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five, that is, (2 major + 3 minor) or 5 minor breakdowns.	None	Yes



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Remark:

- i) The breakdown of rear axle housing during the hydraulic performance was not counted under the code of breakdown as per IS:12207-2014 and considered as accidental breakdown due to improper jacking during the test
- ii) The breakdown of the rear tyre creeping due to excessive ballasting was repeated under supplementary test with revised ballasting.

16.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2008:				
S. No.	Characteristic	Requirements as per IS: 12207-2008	AS observed	Whether meets the requirements (Yes/No.)
1	Maximum oil pull over, (%)	0.25% (max.)	Dry type air cleaner provided	Not applicable
2.	Seating requirements	Should meet the requirements of IS: 12343-1998	Meets the requirements	Yes
3.	Fitment of ROPS	With a provision for fitment of ROPS.	Not provided	Not applicable
		If ROPS fitted it should meet the requirement of IS: 11821-1992	Not provided	Not applicable
4.	Technical requirements for PTO shaft	Should meet the requirements of IS: 4931 -1995	Meets the requirements	Yes
5.	Dimensions of three point linkage	Should meet the requirements of IS: 4468 (Part-I)-1997	Meets the requirements	Yes
6.	Specifications of linkage drawbar	Should meet the requirements of IS: 12953-1990.	Meets the requirements	Yes
	Specification of swinging drawbar	Should meet the requirements of IS: 12362 Part 3-1994.	Not provided	Not applicable
7.	Accessories	Trailer hitch, front tow hook, linkage drawbar may be provided.	Provided	Yes

16.3 Conformity with following IS:

- i) Guidelines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)] : Conforms
- ii) Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS: 4931-1995 (Reaffirmed in March, 2009)] : Conforms
- iii) Agricultural wheeled tractors - Rear mounted three-point linkage: Part 1 Categories 1, 2, 3 & 4 (fourth revision) [IS 4468 (Part-I):1997 (Reaffirmed in March, 2007)/ISO 730-1:1994] : Conforms
- iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)] : Conforms
- v) Agricultural tractors - Operator's seat technical requirement [IS 12343 -1998 (First revision) (Reaffirmed in March, 2009)] : Conforms
- vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision) : [IS 12239 (PT-1)-1996 (Reaffirmed in March, 2009)/ISO 4254-1:1989] : Conforms



- vii) Tractors and machinery for agriculture and forestry – : **Does not conform**
 Technical means for ensuring safety Part 2: Tractors (first revision) IS 12239 (PT-2)-1999 (Reaffirmed in March, 2009)]
- viii) Tractors and machinery for agriculture and forestry, : **Conforms**
 powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1 & Part-2) –2006 & 2007(Reaffirmed in March, 2009)/ ISO 3767-2:1991)]
- ix) Guide lines for location and operation of operator : **Conforms**
 controls on agricultural tractors and machinery (first revision) (IS: 8133 – 1983) (Reaffirmed in March, 2009)]
- x) Agricultural Tractor & Machinery Lighting device for : **Conforms**
 travel on public roads (IS: 14683-1999) (Reaffirmed in March, 2009)]

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance:

- i) The backup torque was observed as 19.87 %.
- ii) The specific fuel consumption corresponding to maximum power was measured as 246 g/kWh against the declaration of 243 g/kWh, which is within the tolerance limit of IS: 12207-2014.
- iii) Maximum equivalent crankshaft torque was observed as 117.62 Nm against the declaration of 128 Nm which is on lower side and does not meet the requirement of relevant IS less than the tolerance limit.

16.4.1.2 Drawbar performance:

- i) During hours of the drawbar test, excessive creeping of LHS & RHS rear tyre over the rims was observed due to which the air valve uprooted from the tube and the same were repeated until the drawbar ballast was revised (**drawbar ballasting was reduced**). This calls for the appropriate ballasting for the various tests w.r.t the tractor capability and necessary corrective action.

16.4.1.3 Hydraulic performance test:

- i) During "Lifting capacity test at the hitch point" the base of the rear housing was broken into multiple pieces. This may be looked into.

16.4.1.4 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.

16.4.2.1 Wetland Cultivation (Puddling Operation):

No ingress of mud/or water was noticed during puddling operation of the tractor. Hence, It meets the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). The tractor is suitable for wetland operation (Puddling).

16.5 Maintenance / Service Problems:

No noticeable maintenance or service problem was observed during the test.

al)
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ed under
ether meets the requirements (Yes/No.)
Not applicable
Yes
Not applicable
Not applicable
Yes
Yes
Yes
Not applicable
Yes



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- 16.7 Recommendation with regard to safety on tractor:**
The following requirements, inter alia, may be considered for incorporation on the tractor:
i) Provision for spark arresting device in exhaust system.
- 16.8 Adequacy of Literature supplied with machine:**
- 16.8.1** The following literature has been supplied with the tractor
i) Operator's Manual
ii) Part's catalogue
iii) Service Manual
- 16.8.2** The literature supplied was found adequate. However, The literatures should also be brought out in national as well as other regional languages for the guidance of users and service personnel.

17.0 Citizen charter

Duration of Test	Test duration under citizen charter (including supplementary test)	Whether the report released within time frame given citizen charter	Remark, if any
9 Months (July, 2015 to March, 2016)	14 Months	Yes	----

TESTING AUTHORITY:

P. C. MESHARAM
SENIOR AGRICULTURAL ENGINEER

C. R. LOHI
DIRECTOR

Test Report compiled by: **Mr. Nitesh Kuamr Verma**, Senior Technical Assistant

18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
18.1	16.4.1.2, 16.4.1.4, 16.7	Observations will be studied and necessary action will be incorporated
18.2	16.4.1.3	During "Lifting capacity test at the hitch point" the root cause for the breakage of rear housing base was the impact point lift load due to improper support & placement of jack for lifting the tractor.