

(यह परीक्षण रिपोर्ट 30/09/2023 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 30/09/2023)



MAHINDRA, JIVO 365 DI P TRACTOR



सत्यमेव जयते

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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T- 1481/2008/2020	MAHINDRA, JIVO 365 DI P TRACTOR - Commercial (Initial)
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Manufacturer : **M/s. Mahindra & Mahindra Limited**
(Farm Equipment Sector)
Mahindra Research Valley-AFS,
Mahindra World City, Plot No. 41/1,
Anjur P.O., Chengalpattu - 603 004
Kanchipuram District

Address of manufacturing plants : **M/s. Mahindra & Mahindra Limited**
(Farm Equipment Sector)
Hingna Road, Hingna MIDC,
NAGPUR- 440 016

: **M/s. Mahindra & Mahindra Limited**
(Farm Equipment Sector)
Agri Business Development Centre, Khatima
Panipat Highway, Udham Singh Nagar,
Vil-Lalpur, Tehsil-Kichha,
RUDRAPUR-263153

: **M/s. Mahindra & Mahindra Limited**
(Farm Equipment Sector) Agri Development Centre,
Vil-Mehla Tehsil-Dudu Jaipur- Ajmer Road,
JAIPUR-303 007

: **M/s. Mahindra & Mahindra Limited**
(Farm Equipment Sector)
Near Bidar "T" Junction , Mahindra
Nagar, Zaheerabad- 502 220

: **M/s. Mahindra & Mahindra Limited**
(Farm Equipment Sector)
Mahindra Research Valley-AFS, Mahindra World
City, Plot No. 41/1, Anjur P.O., **Chengalpattu –**
603 004 Kanchipuram District .

Test requested by : The Manufacturer
Selected for test by : Applicant
Place of running-in : At applicant's works
Duration of said running-in, (h):
- Engine : 30
- Transmission : 30
Method of Selection : 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 : JIVO 365 DI P
Brand name : JIVO
Variants, if any : None
Type : Four wheeled, four wheel driven, unit construction
general purpose, agricultural tractor
Month & Year of manufacture : E H
Chassis number : MBNKPDEAFHZE00001
Country of origin : India

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1	2			3	4																																				
	4	Engine oil	Oil Grade-15W40	6.0 liter																																					
	5	Engine oil filter	Not Available	01 No.																																					
	6.	Thermostat valve opening closing temperature																																							
	7.	Radiator cooling fan cowl fitments were also checked.																																							
2.	<p>After replacement of above parts, a "Repeat test" was conducted. During the two hour maximum power test under high ambient condition the maximum operating temperature of engine oil was recorded as 131°C against the declaration 130°C & which does not meet the evaluative requirement of IS:12207:2019. The overheating tendency of the engine was not rectified.</p> <p>Upon this the applicant has submitted request vide letter No. Nil dated 05.11.2019, the maximum operating temperature of engine oil has been re-declared as 135°C among other parameters. The applicant's request was accepted by the competent authority. Accordingly, the power take-off performance test was conducted.</p>			-	16.3																																				
3.	<p>The firm has submitted a letter No. Nil dated 23.01.2020 to request the replace of following parts for compliance as per IS: 12207-2019 on under ICT test tractor model. Thereafter approval of the competent authority the following components of tractor model were replaced with new ones & permanently implementation on the tractor.</p> <table border="1"> <thead> <tr> <th>Sr.No.</th> <th>Name of components/ Parts</th> <th>Old part</th> <th>New part no & details</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Relief Valve- Control Valve Assembly</td> <td>19432415001</td> <td>19572585000</td> </tr> <tr> <td>2.</td> <td>Engine oil dipstick</td> <td>006027398B1</td> <td>006027398B1</td> </tr> <tr> <td>3.</td> <td>PTO Shaft</td> <td>006517582L1</td> <td>006517582L2</td> </tr> <tr> <td>4.</td> <td>Linkage Drawbar</td> <td>--</td> <td>H08016381L01</td> </tr> <tr> <td>5.</td> <td colspan="3">Reverse shaft & gears</td> </tr> <tr> <td></td> <td>(i) Shaft shuttle (12T)</td> <td>006517514L1 (15 & 18 T)</td> <td>006517514L2 (12 & 18 T)</td> </tr> <tr> <td></td> <td>(ii) Gear 29T Reverse Driven</td> <td>006517522L1 (32 T)</td> <td>006517522L2 (29 T)</td> </tr> <tr> <td></td> <td>(iii) Gear 25T Reverse Idler</td> <td>006517550L1 (22 T)</td> <td>006517550L2 (25 T)</td> </tr> </tbody> </table>			Sr.No.	Name of components/ Parts	Old part	New part no & details	1.	Relief Valve- Control Valve Assembly	19432415001	19572585000	2.	Engine oil dipstick	006027398B1	006027398B1	3.	PTO Shaft	006517582L1	006517582L2	4.	Linkage Drawbar	--	H08016381L01	5.	Reverse shaft & gears				(i) Shaft shuttle (12T)	006517514L1 (15 & 18 T)	006517514L2 (12 & 18 T)		(ii) Gear 29T Reverse Driven	006517522L1 (32 T)	006517522L2 (29 T)		(iii) Gear 25T Reverse Idler	006517550L1 (22 T)	006517550L2 (25 T)	--	27.8
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4.	<p>Initial declaration of lifting capacity at hitch point was 8.83 kN which was replaced by the re-declaration of 12.2 kN by the manufacturer vide letter No. Nil dated 05.11.2019. The firm has again second time re-declared the lifting capacity at hitch point as 7.35 kN vide letter No. Nil dated 06.01.2020 to comply the requirements of IS:12207-2019. During the hydraulic test, the lifting capacity at hitch point was observed as 8.58 kN against the latest declaration of 7.35 kN & which does not meet the evaluative requirement of IS:12207-2019. The frequent change of declaration by the manufacturer indicates that the manufacturer R&D has not tested the tractor enough before starting the commercial production.</p>			--	45.7																																				

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1	2	3	4											
4.	During the field test with rotavator (Farmking make, 30 blades), the overloading (dropping of engine speed) was observed & engine speed dropped from 2840 rpm to 2390 rpm. Upon the request of applicant, the rotavator (Farmking make, 30 blades) was replaced with rotavator (Trakmate make, 24 blades). Accordingly, the field test with rotavator (Trakmate make, 24 blades) was conducted & test results have been reported in this report.	---	55.5											
5	During the field preparation (dry land operation), the leakage of oil was seen from the left side wheel hub of front axle. The following part has been replaced with new ones with same specification as given below.	Mn -13 (Minor-13)	67.2											
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Sr. No.</th> <th style="text-align: center;">Name of components/ Parts</th> <th style="text-align: center;">Part No</th> <th style="text-align: center;">Quantity</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1.</td> <td>Oil seal LHS drive shaft of front axle (split type oil seal)</td> <td>006517212L11</td> <td>01 No.</td> </tr> <tr> <td style="text-align: center;">2.</td> <td>Upper & lower sleeve</td> <td>006517440L1 & 006517441L1</td> <td>01 No.</td> </tr> </tbody> </table>		Sr. No.	Name of components/ Parts	Part No	Quantity	1.	Oil seal LHS drive shaft of front axle (split type oil seal)	006517212L11	01 No.	2.	Upper & lower sleeve	006517440L1 & 006517441L1	01 No.
Sr. No.	Name of components/ Parts		Part No	Quantity										
1.	Oil seal LHS drive shaft of front axle (split type oil seal)		006517212L11	01 No.										
2.	Upper & lower sleeve	006517440L1 & 006517441L1	01 No.											
	The leakage from oil seal defect has been categorized as Mn-13 (Minor-13) as per IS: 12207-2019.													

16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

- 16.1** On the basis of tests conducted the performance results have been summarized as evaluative (mandatory) and non-evaluation (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:-

S. No.	Characteristic	Category (Evaluative/ Non Evaluative)	Requirements as per IS: 12207-2019	Values declared by the applicant (D) / Requirements (R)	As observed	Whether meets the require- ments (Yes/No)
1	2	3	4	5	6	7
16.1.1	PTO Performance :					
a)	Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: ± 5 per cent for PTO Power & or engine power > 26 kW ± 10 per cent for PTO Power & or engine ≤ 26 kW	22.4 (D)	22.3	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	22.4 (D)	22.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% Max.	261.5 (D)	268	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	118 (D)	111.2	Yes
e)	Back-up torque, percent	Evaluative	12 percent, min.	23 (D) 12 (R) Minimum	35.8	Yes
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1	2	3	4	5	6	7	
f)	Maximum operating temperature(°C):						
	1)	Engine oil	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.	135 (D)	131	Yes
	2)	Coolant (liquid)	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.	110 (D)	108	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions	2.73 (R) Maximum	0.16	Yes	
h)	Smoke level, (m ⁻¹)	Evaluative	Maximum light absorption coefficient of 3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	3.25 (R) Maximum	0.31	Yes	
16.1.2	Drawbar performance:						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass with ballast	Applicant has not recommended ballasting	Not applicable	Not applicable	
b)	Maximum drawbar pull with standard ballast corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor with standard ballast	9.95 (D)	10.91	Yes	
				10.06 (R) Minimum			
c)	Maximum drawbar power without ballast, or with standard ballast as the case may be, 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.	18.0 (D)	18.2	Yes	
				16.7 (R) Minimum			
d)	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	89	Yes	

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1	2	3	4	5	6	7
16.1.3	Power lift and hydraulic pump performance :					
a)	Maximum lifting capacity throughout the range of lift, (kN):					
	1) At hitch points	Evaluative	±10 percent	7.35 (D)	8.58	No
	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	5.80 (D) 5.25 (R) Minimum	6.21	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)	Non Evaluative	The observed value should not exceed 50 mm	50 (D) 50 (R) Maximum	00	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 standard ballast, (m):					
	1) Cold brake	Evaluative	10	10 (R)	8.79	Yes
	2) Hot brake	Evaluative	10	10 (R)	8.88	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (R)	178 to 184	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever, N	Evaluative	Yes / No	Yes	Yes	Yes
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 Maximum (R)	96	Yes
	2) Right foot rest				91	Yes
	3) Seat (with operator)				41	Yes
	4) Steering wheel				276	No
16.1.7	Air cleaner:					
	Maximum air cleaner oil pull over, (%)	Evaluative	0.25 % (maximum)	Not applicable	Dry type air cleaner fitted	Yes

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1	2	3	4	5	6	7
16.1.8	Haulage requirements :					
a)	Gross mass of the trailers, (tones):					
	Two wheel	Non Evaluative	To be declared by the	3.0	3.0	Yes
b)	Distance travelled / litre of fuel consumption, (km/l):					
	Two wheel	Non Evaluative	To be declared by the manufacturer	5.00 to 7.79	5.57 to 5.68	Yes
c)	Fuel consumption (ml/km/tonne):					
	Two wheel	Non Evaluative	To be declared by the manufacturer	42.8 to 50.0	58.67 to 59.80	No
16.1.9	Wetland cultivation :					
	1) Clutch assembly	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	Ingress of mud and water not found	Yes
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine Oil	-do-				
	5) Transmission Oil	-do-				
16.1.10	Safety features:					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulics pipes(as per IS-12239 Part 2)	Meet the requirements	Yes	
b)	Lighting arrangement	Evaluative	As per CMVR	Meet the requirements	Yes	
c)	Seating requirements (Tractors having more than 1150 mm rear track width)	Non Evaluative	Should meet the requirements of IS: 12343 (As amended from time to time)	Does not meet the requirements	No	
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	Meet the requirements	Yes	
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	Meet the requirements	Yes	
f)	Specifications of linkage drawbar	Evaluative	Should meet the requirements of IS 12953 (As amended from time to time)	Meet the requirements	Yes	
g)	Specifications of Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirements of IS 12362 (Part 3) (As amended from time to time)	Not fitted	Not applicable	
h)	1) Maximum travelling speed at rated engine speed in reverse gears, kmph	Evaluative	Should not exceed 20 Kmph	18.70 kmph Meet the requirements	Yes	

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	2) Audible warning signal on tractor.	Evaluative	As soon as the travelling speed in reverse gear reaches to 20 kmph, an audible warning signal on tractor shall be activated. The safety aspects about the operation of shuttle technology shall be brought in operation and manufacturer/dealer shall ensure the training on this aspect to operator before the delivery of tractor.	Not applicable		Not applicable		
16.1.11	Labelling of tractors (Provision of labelling plate):							
	1) Make	Evaluative	Should conform to the requirements of CMVR along-with declared value of PTO in kW and year of manufacture in numerical <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>MM</td><td>YY</td></tr></table> Digit 01-12 in box No.1 for MM will represent the month and next two digit in the box No.2 for YY will represent the year of manufacturing	MM	YY	Mahindra		Yes
MM	YY							
	2) Model	Evaluative		JIVO 365 DI P		Yes		
	3) Month & Year of manufacture	Evaluative		E H		No		
	4) Engine number	Evaluative		ZHE5NBR0002		Yes		
	5) Chassis number	Evaluative		MBNKPDEAFHZE00001		Yes		
	6) Declaration of PTO power, kW	Evaluative		22.4		Yes		
	7) Specific fuel consumption ,g/kWh	Evaluative	265.1		Yes			
16.1.12	Discard limit for:							
a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by manufacturer	89.130	88.893 to 88.929	Yes		
b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative	-do-	0.200	0.097 to 0.121	Yes		
c)	Piston diameter, (mm)	Non Evaluative	-do-	88.150	88.808 to 88.825	Yes		
d)	Ring end gap (mm):							
	- Top comp. ring.	Evaluative	To be specified by Manufacturer	2.50	0.35	Yes		
	- 2 nd comp. ring.			2.50	0.60	Yes		
	- Oil ring.			2.00	0.55	Yes		
e)	Ring groove clearance (mm):							
	- Top comp. ring.	Evaluative	To be specified by Manufacturer	0.30	--Tapered--	--		
	- 2 nd comp. ring.			0.30	0.060 to 0.067	Yes		
	- Oil ring.			0.20	0.033 to 0.052	Yes		
f)	Diametrical clearance of main bearings,(mm):							
	- Diametrical	Evaluative	To be specified by Manufacturer	0.20	0.079 to 0.125	Yes		
g)	Clearance of big end bearings, (mm):							
	- Diametrical	Evaluative	To be specified by Manufacturer	0.20	0.038 to 0.062	Yes		
	- Axial			0.75	0.25	Yes		
h)	Crankshaft end float, (mm)	Evaluative	To be specified by Manufacturer	0.60	0.11	Yes		
i)	Clearance between king pin and bush, (mm)	Non Evaluative	To be specified by Manufacturer	0.30	0.102 to 0.144	Yes		
j)	Clearance between center pin and bush, (mm)	Non Evaluative	To be specified by Manufacturer	0.30	0.117 to 0.215	Yes		

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16.1.13	Literature (Submission to test agency):					
a)	Operator manual	Evaluative	Literature should meet the requirement of Indian Standard : 8132	Provided	Provided	Yes
b)	Parts Catalogue			Provided	Provided	Yes
c)	Service manual			Provided	Provided	Yes
16.1.14	Fitment of Roll Over Protective Structure (ROPS): for tractors having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS:11821 or OECD code or equivalent International Standard	Provided	Not Fitted	Not applicable
16.1.15	Standard accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	Provided	Provided	Yes
16.1.16	Optional Accessories	Non Evaluative	Ballast weights if fitted should meet the requirement of CMVR.	Provided	Provided	Yes

16.2 CATEGORY OF BREAKDOWNS / DEFECTS :					
Category of breakdowns / defects (as per clause 5.0 of IS:12207-2019):					
Sl. No.	Category of breakdowns	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2019	As observed	Whether meets the Requirements (Yes/No.)
1	Critical breakdown	Evaluative	There is no 'critical breakdown' during the course of testing.	None	Yes
2	Major breakdowns	Evaluative	There are not more than 2 major breakdowns and neither of them is of repetitive nature.	01 (Mj-05)	Yes
3	Minor breakdowns	Evaluative	There are not more than 5 minor defects during the test and the frequency of each is not be more than two.	01 (Mn-13)	Yes
4	Total breakdowns	Evaluative	In no case, the total number of breakdowns should exceed five that is, (1 major + 4 minor) or 5 minor breakdowns.	02 (Mj-05 & Mn-13)	Yes

16.3 Salient Observations:

16.3.1 Laboratory tests:

16.3.1.1 PTO Performance Test:

- i) During PTO performance test under high ambient condition, the maximum operating temperature of coolant was recorded as 114^oC against the declaration of 110^oC & which does not meet the evaluative requirement of IS:12207. Also, the maximum operating temperature of engine oil was recorded as 130^oC against the declaration of 130^oC. Upon this, the firm has requested vide letter No. Nil dated 05.08.2019 for following checking / adjustment / replacement and accordingly following damaged radiator & other parts were replaced with new ones having same specifications. **The damage of radiator is categorized as Major breakdown (Mj-5) as per IS:12207-2019.**

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Sr. No.	Name of components/ parts	Part No. / Item No.	Quantity
1	Radiator assembly	008009820L1	01 No.
2	Sealing main plate beading	007638491L1	01No.
3	Coolant	M-Star C001	6.1 liter
4	Engine oil	Oil Grade-15W40	6.0 liter
5	Engine oil filter	Not Available	01 No.
6.	Thermostat valve opening closing temperature		
7.	Radiator cooling fan cowl fitments were also checked.		

The breakdown occurred in the radiator assembly has been considered as major breakdown Mj-05 (Major-05). This calls for introduction of stringent quality control measures at production level and improvements in the quality of radiator assembly on the tractor at manufacturing level.

- ii) After replacement of above parts, a “Repeat test” was conducted. During the two hour maximum power test under high ambient condition the maximum operating temperature of engine oil was recorded as **131°C** against the declaration **130°C** & which does not meet the evaluative requirement of IS:12207:2019. The overheating tendency of the engine was not rectified.

Upon this the applicant has submitted request vide letter No. Nil dated 05.11.2019, the maximum operating temperature of engine oil has been **re-declared as 135°C** among other parameters. The applicant's request was accepted by the competent authority. Accordingly, the power take-off performance test was conducted.

- iii) The maximum PTO power was recorded as **22.3 kW** against the declaration of **22.4 kW** which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iv) The specific fuel consumption corresponding to maximum power was recorded as **268 g/kWh** against the declaration of **261.5 g/kWh** meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- v) Maximum equivalent crankshaft torque observed 111.2 against the declaration of 118.0 Nm which meet the requirement of IS: 12207-2019 with regard to tolerance limit.
- vi) The backup torque is **35.8 %** & meets the evaluative requirement of IS:12207-2019.

16.3.1.2 Drawbar performance test:

- i) Maximum drawbar power with standard ballast condition was recorded as **18.2 kW** against the minimum requirement of **16.7 kW** & which meet the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) Maximum drawbar pull with standard ballast condition corresponding to 15 percent wheel slip, (kN) was recorded as **10.91 kN** only against the minimum requirement of **10.06 kN** which is **76 %** of total mass of tractor , which meets the requirement of IS: 12207-2019 with regard to tolerance limit. This should be looked into for corrective action & improvement drawbar pull in case of 4WD tractor.

16.3.1.3 Hydraulic performance test:

- i) The firm submitted a letter no. nil dated 23.01.2020 to request the replace of following parts for compliance as per **IS: 12207-2019** on under ICT test tractor model. Thereafter approval of the competent authority the hydraulic relief valve assembly were replaced with new ones & permanently implementation on the tractor production from chassis & engine number –MBNKPDEAFJB00001 & ZJB5NBR0060 respectively.
- ii) Initial declaration of lifting capacity at hitch point was 8.83 kN which was replaced by the re-declaration of 12.2 kN by the manufacturer vide letter No. Nil dated 05.11.2019. The firm has again second time re-declared the lifting capacity at hitch point as 7.35 kN vide letter No. Nil dated 06.01.2020 to comply the requirements of IS:12207-2019.

During the hydraulic test, the lifting capacity at hitch point was observed as 8.58 kN against the latest declaration of 7.35 kN & which does not meet the evaluative requirement of IS:12207-2019. The frequent change of declaration by the manufacturer indicates that the manufacturer R&D has not tested the tractor enough before starting the commercial production.

16.3.1.4 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 especially on steering control wheel to improve the operational comfort and service life of components.

16.3.1.5 Symbols for operator controls and displays:

Oil lubricant type & frequency are not identifiable with the symbols as per IS: 6283 (Part-1 & 2) -2006 & 2007 (re-affirmed in March, 2014). This should be pay attention for improvement as per relevant test code.

16.3.1.6 Field test (dry land operation)

- (i) During the field preparation (dry land operation), the leakage of oil was seen from the left side wheel hub of front axle. The following part has been replaced with new ones with same specification as given below.

Sr. No.	Name of components/ Parts	Part No	Quantity
1.	Oil seal LHS drive shaft of front axle (split type oil seal)	006517212L11	01 No.
2.	Upper & lower sleeve	006517440L1 & 006517441L1	01 No.

The leakage from oil seal defect has been categorized as Mn-13 (Minor-13) as per IS: 12207-2019.

- ii) During the field test with rotavator (Farmking make, 30 blades), the overloading (dropping of engine speed) was observed & engine speed dropped from 2840 rpm to 2390 rpm.

Upon the request of applicant, the rotavator (Farmking make, 30 blades) was replaced with rotavator (Trakmate make, 24 blades). Accordingly, the field test with rotavator (Trakmate make, 24 blades) was conducted & test results have been reported in this report.

- ii) During the field test (ploughing operation) the area covered **0.108 to 0.113 ha/h** which is less & the average fuel consumption **33.81 to 36.67 l/ha** which is considered very high for time required & fuel consumed to cover one hectare land in ploughing operation. This should be looked into for corrective action.

Keeping in view the basic function of the tractor that is to perform different field operations smoothly and the matching implements play very imperative role in such operations. The overall performance of the tractor directly depends on the matching implements. It is therefore recommended that, before recommendation of matching implements for the tractor an exhaustive internal testing should be conducted at R&D level of the manufacturer so that farmers/user's may not face any complexity in operation of the tractor.

16.3.1.7 Wet land cultivation (Puddling operation):

- i) No ingress of mud and / or water was noticed during puddling operation of the tractor and meet the requirements of IS: 11082-1984 (Technical requirements of agricultural tractors for wetland operation). Therefore, the tractor is recommended as suitable for wetland operation (Puddling).
- ii) For wet land cultivation the applicant specified rotavator having 32 numbers of blades for puddling test. This should be mentioned clearly and boldly In all the literature relevant to this tractor model.

16.3.1.8 Labelling plate:

- i) The month & year of manufacture embossed on the labelling plate as 'EH', which does not meet the evaluative requirement of IS: 12207-2019. This should be in numerical form (MMYY) on the labelling plate.
- ii) The specific fuel consumption 265.1 g/kWh has been embossed on the labeling plate by the manufacturer. Whereas the same has been declared as 261.5 g/kWh vide specification sheet. This should be looked into for corrective action.

16.3.1.9 Make of Hydraulic pump, Steering system & Steering oil Pump:

The make of hydraulic pump, steering system, steering oil pump from the name appears to be manufactured in other country. Whereas, the same has been specified that all the parts have been produced indigenously vide specification sheet & list of imported components also has not been submitted. This should be looked into for necessary clarification.

16.3.1.10 Maximum Permissible capacity of steering wheels:

The maximum permissible capacity of steering wheels is 720 kg (360 kg per tyre at 100 kPa at recommended inflation pressure) for two tyres. Whereas, the actual front axle weight is 750 kg. This should be looked into for necessary corrective action from safety point of view.

16.4 Maintenance / Service Problems:

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

16.5 Recommendation with regard to safety on tractor:

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

- i) Provision for adjustment for driver's mass should be provided as per relevant standard.
- ii) Vertical distance from SIP to centre of clutch pedal, brake pedal & differential lock pedal.



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- iii) Longitudinal distance from SIP to centre of differential lock pedal.
- iv) Vertical retainness of both side at foot pedal.
- v) Type of suspension & dampening has not been provided in operator seat.
- vi) There should be provision for spark arresting device in exhaust system.
- vii) Anti slip surface for floor area at operating position.
- viii) Stop control knob does not remains at stop position
- ix) Colour codes engine revolution gauge has not been provided .
- x) The working clearance between the position control lever and draft control lever should be provided as per relevant standard.

16.7 Adequacy of Literature supplied with machine:**16.7.1** The following literature was supplied with the tractor for reference during the test.


- i) Operator's manual for Mahindra JIVO 365 DI P tractor.
- ii) Spare part's catalogue for Mahindra JIVO 365 DI P tractor.
- iii) Service manual for Mahindra JIVO 365 DI P tractor.

16.7.2 It is therefore, recommended that following literature may be brought out as per IS: 8132-1999 (Reaffirmed in 2014) for the guidance of users and service personnel in national as well as regional languages for this model of tractor.**17. Citizen charter**


Time frame for testing & evaluation as per citizen charter	Duration of Test	Whether the report released within time frame given in the citizen charter	Remark
10 Months	17 Months (April, 2019 to August, 2020)	No	Delay of 8 (Eight) months (June, 2019 to January, 2020) occurred in resolving issue in respect of overheating problem, hydraulic test etc. & supply of relevant spare parts by the manufacturer.

TESTING AUTHORITY

C. S. RAGHUWANSHI
AGRICULTURAL ENGINEER



C. V. CHIMOTE
TEST ENGINEER



J. J. R. NARWARE
DIRECTOR

The report compiled by: Shri Dev Vrat Kumar, Senior Technical Assistant.

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18. APPLICANT'S COMMENTS

Para no.	Our reference	Applicant comments
18.1	16.3.1.1 (i)	Radiator Assembly – Quality tests including leak test at 1.5kg/cm ² pressure ensured at supplier end. The production tractor is meet coolant temp requirement. The Stringent Quality controls have been introduced on production to ensure quality service to the farmer.
18.2	16.3.1.8 (i) & (ii)	Month & Year of manufacture of the tractor in numerical “MMYY” form on labelling plate has implemented on regular production w.e.f. 01.09.2020 of subject tractor model. The cut off chassis numbers details are as follows:- Chassis No.MBNKPDEAFLZF00290 Engine No.: ZLE5NBR0633
18.3	16.3.1.9	The observed part i.e. Hydraulic & Steering oil pump is a tandem pump brought from our own subsidiary company i.e. “M/s Mitsubishi Mahindra Agricultural Co. Ltd. Japan” and not from any outside manufacturer from other country . Indigenisation of the same is in process.
18.4	16.5 (i) & (x)	Observation will be studied, and necessary corrective action will be initiated.
18.5	16.7.2	Literatures are available in all regional languages of India.

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ANNEXURE-I

BRIEF SPECIFICATION OF IMPLEMENTS USED DURING FIELD TEST

S. No.	Parameters	MB Plough	Rotavator	Rotavator (for puddling)
1	Make	Soil Agro Equip. Pvt. Ltd.	Trakmate	M & M
2	Type	Mounted, Reversible MB	Mounted	Mounted
3	No. of Discs / Blades	One	24blade on 8 flange	32
4	Type of Discs / Blades	Sod breaker	L shape	J shape
5	Size of Discs / Blades (mm)	350	245 x 50 x 4	200 x 65 x 5
6	Spacing of Discs /Flanges, (mm)	Not Applicable	230	200
7	Lower hitch point span, (mm)	625	770	650
8	Mast height, (mm)	460	550	365
9	Overall Dimensions (mm):			
	Length	1240	1390	1750
	Width	1050	750	820
	Height	1015	1040	995
10	Gross Mass, (Kg)	200	360	335

ANNEXURE -II

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS	HOURS
1.	Running-in	--
2.	PTO Performance Test	27.3
3.	Drawbar performance test	13.1
4.	Power lift and hydraulic pump performance test	2.8
5.	Turning ability	0.2
6.	Center of gravity Test	0.3
7.	Operator's field of vision	0.2
8.	Brake test	0.8
9.	Noise measurement	1.0
10.	Mechanical vibration test	0.8
11.	Theoretical speed test	1.8
B.	FIELD TEST	
1.	Ploughing	10.0
2.	Rotavation	10.3
3.	Puddling (including 5.0 hours of water proof test)	15.2
C.	HAULAGE TEST	6.7
D.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	8.0
TOTAL:		97.7