

(यह परीक्षण रिपोर्ट 31/03/2024 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 31/03/2024)



INDO FARM, 2042 DI HS 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

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2. FUEL AND LUBRICANTS

2.1 Fuel : The high-speed diesel oil supplied by M/s Indian Oil Corporation Limited having density of 0.836 gm/cc at 15°C was used.

2.2 Lubricants:

S. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine and Air cleaner oil	SAE 20W40	As recommended
2.	Transmission, brakes & Hydraulic system oil	Tract ELF 2900 MM	Oil originally filled in the tractor systems were not changed
3.	Steering system oil	EP 80	
4.	Grease	Multipurpose grease	Multipurpose grease

3. ESSENTIAL TEST

3.1. SPECIFICATIONS

3.1.1 Tractor:	<u>Base Model</u>	<u>Variant Model</u>
Make	:	Indo Farm
Model	:	3035 DI C-Mesh 2042 DI HS
Brand name	:	Indo Farm
Type	:	Four wheeled, rear wheel driven, unit construction, standard agricultural tractor
Month & Year of manufacture	:	04 & 18 (April, 2018) 07/20
Chassis number	:	DNW303500001CM GPM2042000002
Country of Origin	:	India
3.1.2 Engine:		
Make	:	Indo Farm
Model	:	Indo Farm 3035 DI Indo Farm 3250A
Type	:	Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.
Serial number	:	C3286B00002NW T244276B
Engine speed (Manufacturer's recommended production setting), (rpm):		
- Maximum speed at no load	:	2240 to 2360 2150 to 2250
- Low idle speed	:	500 to 600 700 to 800
- Speed at maximum torque	:	1200 to 1400 1100 to 1300
Rated speed, (rpm):		
- For PTO use	:	2100 2000
- For drawbar use	:	2100 2000
3.1.3 Cylinder & Cylinder Head:		
Number	:	Three
Disposition	:	Vertical, inline
Bore/stroke, (mm) (apa)	:	105/110 91.44 / 127
Capacity as specified by the applicant, (cc) (apa)	:	2858 2502
Compression ratio	:	19.0± 0.5 : 1 18.5:1
Type of cylinder head	:	Individual Monoblock
Type of cylinder liners	:	Wet, replaceable Dry, Non replaceable
Type of combustion chamber	:	Re-entrant cavity on piston crown
Arrangement of valves	:	Over head, Inline
Valve clearance (cold/hot):		
- Inlet valve, (mm)	:	0.3 / 0.3 0.3 / 0.3
- Exhaust valve, (mm)	:	0.4 / 0.4 0.3 / 0.3

7. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

7.1 On the basis of test conducted the performance results have been summarized as evaluative (mandatory) and non – evaluative (not mandatory) parameters applicable for qualifying Minimum Performance Criteria as per clause-4 table-1 of **Indian Standard 12207: 2019** 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: 12207-2019	Values declared by the applicant (D)/Requirement (R)		As observed		Whether Variant model meets the requirements (Yes/No)
				Base model	Variant Model	Base model	Variant model	
1	2	3	4	5a	5b	6a	6b	7
7.1.1 PTO Performance:								
a)	Max. power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: ± 5 percent for PTO power and engine power > 26kW. ± 10 percent for PTO power and or engine ≤ 26 kW.	22.5 (D)	25.8 (D)	22.2	25.3	Yes
b)	Power at rated engine speed, (kW)	Evaluative	-do-	22.5 (D)	25.8 (D)	22.2	25.3	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% Max.	270 (D)	275 (D)	280	267	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	125 (D)	142.8 (D)	131.5	144.1	Yes
e)	Back-up torque, percent	Evaluative	12 percent, min.	15.0 (D)	16.0 (D)	30.1	19.2	Yes
f)	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)	3.25	0.17 per m	0.12 per m	Yes
7.1.2 Drawbar performance :								
a)	Max. drawbar pull without ballast or with standard ballast , as the case may be corresponding to 15 percent wheel slip or 7 percent track slip, kN	Evaluative	Minimum 70 percent of static mass of tractor without ballast or with standard ballast, as the case may be	13.07 (D) 13.94 (R) Minimum	13.11 (D) 13.15 (R)	14.00	16.9	Yes

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1	2	3	4	5a	5b	6a	6b	7
b)	Maximum drawbar power without 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.	19.0 (D) 17.8 (R) Minimum	20.64 (D) 20.2 (R) Minimum	18.1	22.5	Yes
c)	Max. transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	120 (D)	120 (D)	59	59	Yes
7.1.3 Power lift and hydraulic pump performance:								
a)	Maximum lifting capacity throughout the range of lift, (kN):							
	1) At hitch points	Evaluative	Tolerance of ± 10%	14.50 (D)	13.70	15.67	12.35	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	10.00 (D) 5.23 (R) Minimum	10.00 (D) 5.96(R) Minimum	9.86	10.94	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	The observed value should not exceed 50 mm	50 (D) 50 (R) Maximum		35	30	Yes
7.1.4 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 (D)		7.55	7.73	Yes
	2) Hot brake	Evaluative	10	10 (D)		7.71	8.01	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600	600 (D)		223 to 309	173 to 199	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 (D)		Yes	242	Yes
7.1.5 Air cleaner oil pull over:								
	Maximum air cleaner oil pull over (%)	Evaluative	0.25 % (max.)	Dry type air cleaner is fitted	0.25% (max)	Not applicable	0.16	Yes

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7.1.6		Safety features:			
a)	Guards against moving and hot parts	Evaluative	Belt drives, pullies, silencer, hydraulic pipes (As per IS 12239 (Part2))	Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	Meets the requirement	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 requirement	No
d)	Technical requirements for PTO shaft	Evaluative	Should meet the requirements of IS: 4931 (As amended from time to time)	Meets the requirement	Yes
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS: 4468 (Part-I) (As amended from time to time)	Does not meet the requirement	No
f)	Specifications of linkage	Evaluative	Should meet the requirements of IS: 12953 (As amended from time to time)	Meets the requirement	Yes
g)	Swinging drawbar (wherever fitted)	Evaluative	Should meet the requirement of IS: 12362 (Part 3) (As amended from time to time)	Not Provided	Not applicable
h)	1) Maximum travelling speed at rated engine speed in reverse gear, (kmph)	Evaluative	Should not exceed 20 kmph	12.60 kmph (Meets the requirement)	Yes
	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 fitted	Not applicable
7.1.6	Labelling of tractors (Provision of labelling plate):				
	1) Make	Evaluative	Should conform to the requirements of CMVR along with maximum PTO Power in kW and year of manufacture in numerical form. <div style="border: 1px solid black; display: inline-block; padding: 2px;">MM YY</div> Digit 01 – 12 in box No.1 for MM will represent the months and next two digits in box No.2 for YY will represent the year of manufacturing.	Indo Farm	Yes
	2) Model	Evaluative		2042 DI HS	Yes
	3) Month & Year of manufacture	Evaluative		07/20	Yes
	4) Engine number	Evaluative		T244276B	Yes
	5) Chassis number	Evaluative		GPM2042000002	Yes
	6) Declaration of PTO power, kW	Evaluative		25.8	Yes

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1	2	3	4	5a	5b	6a	6b	7
7.1.7	Literature (Submission to test agency):							
(a)	Operator manual	Evaluative	Provided / Not Provided	Provided		Provided		Yes
(b)	Parts Catalogue	Evaluative	Provided / Not Provided	Provided		Provided		Yes
(c)	Workshop/ Service manual	Evaluative	Provided / Not Provided	Provided		Provided		Yes
7.1.8	Fitment of roll Over protective structures (ROPS): for tractor having more than 1150 mm rear track width		ROPS should meet the requirement of IS 11821 or OECD code or equivalent International standard	ROPS not fitted				Not applicable
7.1.9	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.	Provided				Yes
7.1.10	Accessories (optional)	Non Evaluative	Ballast weights, if fitted, should meet the requirement of CMVR	Provided				Yes

7.2 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	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 three 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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7.3 Salient Observations:

7.3.1 Laboratory tests:

7.3.1.1 PTO Performance:

- i) The maximum PTO power was recorded as **25.3** against the declaration of **25.8 kW**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **267 g/kWh** against the declaration of **275 g/kWh**, which is within the tolerance limit of IS: 12207-2019.
- iii) The maximum equivalent crankshaft torque was recorded as **144.1 Nm** against the declaration of **142.8 Nm**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iv) The backup torque was recorded as **19.2 %**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

7.3.1.2 Drawbar Performance test :

- i) The maximum drawbar pull with unballasted condition corresponding to 15 % wheel slip was recorded as **16.9 kN** respectively against the declaration of **13.11 kN**, which is within the tolerance limit as specified in IS:12207-2019.
- ii) The maximum drawbar power without ballast was recorded as **22.5 kW** against the declaration of **20.64 kW**, which is within the tolerance limit as specified in IS: 12207-2019.

7.3.1.3 Hydraulic performance test:

- i) Maximum lifting capacity throughout the range of lift at hitch point and standard frame was recorded as **12.35 kN & 10.94 kN** respectively against the declaration of **13.7 kN & 10.0 kN** respectively & which meet the requirement of IS: 12207-2019.
- ii) The maximum lifting capacity on standard frame throughout the range of lift was observed as **10.94 kN** and the moment about rear axle was computed as **16.19 kN-m**, which is considered on higher side compared to the moment from front axle i.e. **13.77 kN-m**. It is therefore, recommended that the lifting capacity of the hydraulic system may be reduced suitably or standard ballast mass at front axle may be provided to avoid front lifting of the tractor.
- iii) During hydraulic performance test, hydraulic pump discharge was recorded as **10 l/min** against the declaration of **17 l/min**. Thereafter, oil filter (Part No. 60088095 AA) was replaced with new one.

7.3.1.4 Three point linkage:

- i) The lateral distance from lower hitch point to centre line of tractor does not meet the requirement of IS: 4468 (Part-1)-1997(Reaffirmed in October 2017). This should be looked into for necessary corrective action.
- ii) Some of the parameters of three point linkage conforms to Cat-I and some of them conforms to Cat-II keeping in view the spirit of standardization necessary improvements may be incorporated.

7.4 Maintenance / Service problems:

No noticeable maintenance and service problems was observed during the test.

7.5 Recommendation with regard to safety on tractor:

The following requirements, inter alia, may be considered for incorporation on the tractor as per relevant Indian Standards:

- i) Vertical distance from seat index point to the centre of clutch and brake pedal was measured as 305 & 345 mm respectively against the requirement of 380 to 620 mm. It should be as per IS: 12343-1998 (Reaffirmed in 2014)
- ii) Width of foot step was measured as 160 mm. It should be 200 mm (min) as per IS: 12239 (Part-1)-1996 (Reaffirmed in October, 2017).
- iii) Spark arrester should be provided in the exhaust system as per IS: 12239 (Part-2) – 1999 (Reaffirmed in 2014).

- iv) Fuel shut-off knob should be remain in stop position as per IS: 8133 -1983 (Reaffirmed in 2014).
- v) Safety switch should be provided to avoid accidental start of the tractor as per IS: 8133 -1983 (Reaffirmed in 2014).
- vi) There should be provision of differential lock IS: 12239 (Part-2) – 1999 (Reaffirmed in 2014).
- vii) PTO shaft master shield should be provided as per IS: 12239 (Part-1)-1996 (Re-affirmed in October, 2017).
- viii) The working clearance between the position control lever and draft control lever was measured 55 mm against the minimum requirement of 70 mm. It should be as per IS: 12239 (Part-2) – 1999 (Reaffirmed in 2014).

7.6 Adequacy of Literature:

7.6.1 The following literatures were supplied with the test tractor for reference during the test:-

- i) Operator's Manual of Indo Farm 2042 DI HS, 2035 DI & 2030 DI Tractor
- ii) Spare Parts Catalogue of Indo Farm 2042 DI HS, 2035 DI & 2030 DI Tractor
- iii) Service Manual of Indo Farm 2042 DI HS, 2035 DI & 2030 DI Tractor

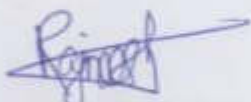
7.6.2 These literatures may also be brought out in national & other regional languages for the guidance of user's and service personnel.

The results of the tests carried out on variant model "Indo Farm 2042 DI HS" tractor has been compared with those on base model "Indo Farm 3035 DI C-Mesh" and found within the limit, as specified in Indian Standard: 12207-2019.


8. 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	4 Months (October, 2020 to January, 2021)	Yes	None

TESTING AUTHORITY:


RAJNEESH PATEL
 AGRICULTURAL ENGINEER


C.V. CHIMOTE
 TEST ENGINEER


J.J.R. NARWARE
 DIRECTOR

This test report is compiled by Smt. Poonam Khurasia, Senior Technical Assistant

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9. APPLICANT COMMENT'S

Para No.	Our Reference	Applicant's comments
9.1	7.1.6 (c) & (e)	We are looking into these for strict compliance to the relevant standards.
9.2	7.3.1.3 (ii)	We would make effort to do the needful.
9.3	7.3.1.4 (i)	We will look into this for future improvements.
9.4	7.5 (i), (ii),(iii), (iv), (v), (vi), (vii) & (viii)	We will look into these points for future improvements.

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ANNEXURE- I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	<u>HOURS</u>
1.	Running-in	15.00
2.	PTO performance test under natural ambient condition	7.43
3.	Power lift and hydraulic pump performance test	1.50
4.	Drawbar performance test	4.54
5.	Brake test	1.00
6.	Air cleaner oil pull over test	3.50
7.	Turning ability test	0.25
8.	Location of centre of gravity	0.25
9.	Nominal speed test	0.75
B.	Miscellaneous test and other run hours including idle run, transportation, preparation for test and trial runs.	3.05
TOTAL		37.27