

व्यावसायिक परीक्षण रिपोर्ट (वैरिएंट)
COMMERCIAL TEST REPORT (Variant)

संख्या / No. : T-1500/2027/202
माह / Month : December, 2021

(यह परीक्षण रिपोर्ट 31/12/2023 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 31/12/2023)



INTERNATIONAL TRACTORS LIMITED,
DI - 42 HDM POWER PLUS
(BRAND NAME - SONALIKA) 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 g/cc at 15°C was used.

2.2 Lubricants:

	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine lubricating oil	SAE 20W40	As recommended
2.	Gearbox, differential, final drive, hydraulic, steering and brake system	SAE-EP-80	Oil originally filled in the tractor system was not changed
3.	Grease	Multipurpose grease	MP Grease

3. ESSENTIAL TEST

3.1. SPECIFICATIONS

3.1.1	Tractor:	Base Model	Variant Model
	Make	International Tractors Limited	
	Model	DI- 35 HDM	DI- 42 HDM Power Plus
	Brand name	RX	Sonalika
	Type	Four wheeled, Rear wheel driven, Unit construction, General purpose, Agricultural tractor	
	Month & Year of manufacture	03/20	06/2020
	Chassis number	AYASH920109S3	HZYSH939622S3
	Country of Origin	India	
3.1.2	Engine:		
	Make	Sonalika	International Tractors Limited
	Model	3100FLU	3102 NL
	Type	Four stroke, liquid cooled, naturally aspirated, direct injection, diesel engine	
	Serial number	3100FLU04C915668F18	3102NL04E922997F33
	Engine speed (Manufacturer's recommended production setting), (rpm):		
	- Maximum speed at no load	1900 to 2000	1950 to 2050
	- Low idle speed	700 to 800	750 to 850
	- Speed at maximum torque	1000 to 1200	
	Rated speed, (rpm):		
	- For PTO use	1800	
	- For drawbar use	1800	
3.1.3	Cylinder & Cylinder Head:		
	Number	Three	
	Disposition	Vertical, inline	
	Bore/stroke, (mm)	100 / 118	102/118
	Capacity as specified by the applicant, (cc)	2780	2891
	Compression ratio	18.2 (±0.2) : 1	20 (±0.2) : 1
	Type of cylinder head	Individual, Inline	
	Type of cylinder liners	Wet, replaceable	
	Type of combustion chamber	Re-entrant cavity on piston crown	
	Arrangement of valves	Overhead, inline	
	Valve clearance (Cold/Hot):		
	- Inlet valve, (mm)	0.30 / 0.30	
	- Exhaust valve, (mm)	0.40 / 0.40	

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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)	Maximum 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.	26.0 (D)	30.6 (D)	25.5	30.0	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	26.0 (D)	30.6 (D)	25.5	29.6	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative	+10 %	250 (D)	245 (D)	243	239	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	160 (D)	190 (D)	161.6	181.4	Yes
e)	Back-up torque, percent	Non Evaluative	12 percent, min.	10 %, min (R)	12%, min(R)	19.4	15.5	Yes
7.1.2	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 m	10 (R)	8.61*	7.88	Yes	
	2) Hot brake	Evaluative	10 m	10 (R)	8.65*	8.16	Yes	
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)	Evaluative	600 N	600 (R) Max.	257* to 305	387 to 398	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 (R)	Yes*	Yes	Yes	
Remark (*): - Data has been taken from Initial Commercial Test report of Sonalika DI-35 HDM (Brand Name: RX) Tractor model tested vide Test report No. T- 1089/1614/2017 (May, 2017)								

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1	2	3	4	5a	5b	6a	6b	7		
7.1.3	Safety features:									
a)	Guards against moving and hot parts	Evaluative		Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 (Part2))		Meets the requirements		Yes		
b)	Lighting arrangement	Evaluative		As per CMVR		Meets 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)		Meets 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)		Does not Meet the requirements		No		
f)	Specifications of linkage drawbar	Evaluative		Should meet the requirements of IS: 12953 (As amended from time to time)		Meets the requirements		Yes		
g)	Swinging drawbar (wherever fitted)	Evaluative		Should meet the requirement 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 gear, (kmph)	Evaluative		Should not exceed 20 kmph		12.02 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 applicable		Not applicable	
7.1.4	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. <table border="1" style="margin: 0 auto;"><tr><td>MM</td><td>YY</td></tr></table> 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.	MM	YY	International Tractors Limited		Yes
MM	YY									
	2)	Model	Evaluative			DI-42 HDM POWER PLUS		Yes		
	3)	Month & Year of manufacture	Evaluative			06 /20		Yes		
	4)	Engine number	Evaluative			3102NL04E9229 97F33		Yes		
	5)	Chassis number	Evaluative			HZYSH939622S3		Yes		
	6)	Declaration of PTO power, kW	Evaluative		30.6		Yes			

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7.1.5	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
7.1.6	Fitment of Roll Over Protective Structures (ROPS): for tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS 11821 or OECD code or equivalent International standard	ROPS not fitted		Not applicable
7.1.7	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with the tractor.	Provided		Yes
7.1.8	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 (1 major + 4 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 power in case of base & variant model was observed as **25.5&30.0 kW** respectively against the declaration of **26.0 kW &30.6 kW** respectively and which is within the tolerance limit specified in **IS: 12207-2019**.
- ii) The specific fuel consumption in case of base and variant models corresponding to maximum power was observed as **243& 239 g/kWh** against the declaration of **250 & 245 g/kWh** respectively and which is within the tolerance limit of IS: 12207-2019.
- iii) The maximum equivalent crankshaft torque was recorded as **181.4Nm** against the declaration of **190 Nm**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iv) The backup torque is **15.5 %** & meets the evaluative requirement of **IS: 12207-2019**.

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 of from seat index point to the centre of clutch pedal should be as per relevant Indian Standard for easy maneuverability of tractor.
- ii) Inclination of backrest should be provided as per relevant standard.
- iii) Fuel shut-off knob does not remain in “STOP” position.
- iv) The colour code of engine revolution gauge should be as per relevant code.
- v) Vertical retainness is not provided on both sides of pedals
- vi) There should be provision for spark arresting device in exhaust system.
- vii) There should be Provision of PTO master shield
- viii) There should be provision of differential lock.
- ix) The working clearance between position control lever & mudguard should be provided as per relevant standard.

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 for International Tractor Ltd. DI-42 HDM, DI- 42 HDM S3, DI-42 HDM 4WD, DI-42 HDM POWER PLUS, DI-47 HDM, DI-745 III HDM, DI-50, DI-55 tractor models.
- ii) Service Manual (Part-I & II) for International Tractor Ltd. DI – 42 HDM, DI – 42 HDM S3, DI-42 HDM 4WD, DI-42 HDM POWER PLUS, DI-47 HDM, DI-745 III HDM, DI-50, DI-55 tractor models.
- iii) Spare parts Catalogue (Part-I & II) for International Tractor Ltd. DI – 42 HDM, DI – 42 HDM S3, DI-42 HDM 4WD, DI-42 HDM POWER PLUS, DI-47 HDM, DI-745 III HDM, DI-50, DI-55 tractor models.

7.6.2 The supplied literature was found adequate. Except the following:

- i) Lubricant oil recommended grade has not been provided in the service manual.
- ii) The oil change period of transmission given in the operator manual does not match with the technical specification as 1800 hours of operation whereas in the operator manual oil change period declared as 2000 hours of operation. This should be into necessary corrective action.

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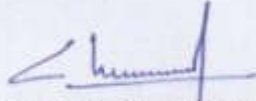
7.6.3 However, these literatures should also be brought out in other vernacular languages of India for guidance of users.

The results of the tests carried out on variant model "International Tractors Limited, DI-42 HDM Power Plus" Tractor have been compared with those on base model "International Tractors Limited, DI-35 HDM (Brand Name: RX)" Tractor tested vide test report No. T-1089/1614/2017 (May,2017), T- 1240/1767/2019(May,2019), T-1441/1968/2020(June)& found within the limitas 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	3 Months (September, 2020 to November, 2020)	Yes	None

TESTING AUTHORITY:


C.S. RAGHUWANSHI
AGRICULTURAL ENGINEER


C.V. CHIMOTE
TEST ENGINEER


J.J.R. NARWARE
DIRECTOR

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

9. APPLICANT COMMENT'S

Para No.	Our reference	Applicant's comment
9.1	7.6.2	Recommended grade of lubricants, oil change period will be update in tractor literature & it will take care for future model.
9.2	7.6.3	We are already publishing the tractor literature in national as well as regional language.

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ANNEXURE- I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	<u>HOURS</u>
1.	Running-in	--
2.	PTO performance test under natural ambient condition	4.3
3.	Brake test	3.3
3.	Turning ability test	1.0
4.	Nominal speed test	1.0
B.	Miscellaneous test and other run hours including idle run, transportation, preparation for test and trial runs.	0.3
TOTAL		9.9