

व्यावसायिक परीक्षण रिपोर्ट (प्रथम बैच परीक्षण) संख्या / No. : T- 1623/2154/2022
COMMERCIAL TEST REPORT (First Batch Test) माह / Month : February, 2022

[ONLINE TESTING]

(यह परीक्षण रिपोर्ट 28/02/2027 तक वैध है। / THIS TEST REPORT IS VALID UPTO : 28/02/2027)



**INTERNATIONAL TRACTORS LIMITED,
SONALIKA INTERNATIONAL DI - 35 RX CM PLUS TRACTOR**



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, Cooperation & Farmers Welfare)

केन्द्रीय कृषि मशीनरी प्रशिक्षण एवं परीक्षण संस्थान

ट्रैक्टर नगर, बुदनी (म.प्र.) 466 445

CENTRAL FARM MACHINERY TRAINING & TESTING INSTITUTE

(An ISO 9001: 2015 Certified Institute)

TRACTOR NAGAR, BUDNI (M.P.) 466 445

E-mail: fmti-mp@nic.in

Web site: <http://www.fmttibudni.gov.in>

Telephone: 07564-234729, 234743

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	(THIS TEST REPORT IS VALID UPTO: 28/02/2027)

Manufacturer : M/s. International Tractors Limited,
Vill. Chak Gujran, P.O. Piplanwala,
Jalandhar Road, District: Hoshiarpur – 146 022
(Punjab), India

Test requested by (applicant) : The Manufacturer
Selected for test by : The testing authority
Place of running-in : At Testing Institute

Duration of said running-in (h):
- Engine : 20
- Transmission : 20

Method of Selection : The test sample was selected randomly out of five tractors from the production line by the representative of testing authority through online mode.

Details of tractors made available for random selection	
Sr. No.	Chassis serial Number
1	3100FL14F1067822F3
2	3100FL14F1067824F3
3	3100FL14F1067825F3
4	3100FL14F1067823F3
5	3100FL14F1065818F3

1. BACKGROUND

1. Base model “International Tractors Limited, Sonalika International DI – 35 RX CM Plus” tractor was tested under Initial Commercial Testing vide Test Report No. T-991/1515/2015 (November, 2015).
2. Administrative Extension of “International Tractors Limited, Sonalika International DI – 35 RX CM Plus” tractor was released vide test report no. T-1399/1926/2020, (March, 2020).
3. Now, the applicant has submitted an online application, 28/2020-21/77 dated 19.03.2021 for 1st batch testing of “International Tractors Limited, Sonalika International DI – 35 RX CM Plus” tractor. The relevant tests on the tractor model were conducted under batch test and accordingly the Test Report is released as under.

2. FUEL AND LUBRICANTS

2.1 Fuel : The High-speed diesel oil supplied by M/s. Indian Oil Corporation Limited having density of 0.827 g/cc at 15°C was used.

2.2 Lubricants:

S. No.	Particulars	As recommended by the manufacturer	As used during the test
1.	Engine oil	SAE 20W 40	SAE 20W 40
2.	Transmission and Hydraulic system	SAE – EP - 80	Oil originally filled in the tractor was not changed
3.	Steering housing oil	EP - 80	
4.	Grease	Multipurpose grease	MP Grease

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3. SPECIFICATIONS

- 3.1 Tractor:**
- Make : International Tractors Limited
Model : Sonalika International DI - 35 RX CM Plus
Type : Rear Wheel Drive, Standard Agricultural Tractor.
Month & Year of manufacture : 06/2021
Chassis number : HYASR1073681S3
Country of Origin : India
- 3.2 Engine:**
- Manufacturer's address : M/s. International Tractors Limited,
Vill. Chak Gujran, P.O. Piplanwala,
Jalandhar Road, Hoshiarpur – 146 022
(Punjab)
- Make : International Tractors Limited
Model : 3100 FL
Type : Four stroke, naturally aspirated, water cooled,
direct injection, diesel engine.
Serial number : 3100FL14F1067824F3
- Engine speed (Manufacturer's recommended production setting), (rpm):**
- Maximum speed at no load : 2150 to 2250
- Low idle speed : 650 to 750
- Speed at maximum torque : 1100 to 1300
- Rated speed, (rpm):**
- For PTO use : 2000
- For drawbar use : 2000
Country of Origin : India
- 3.3 Cylinder & Cylinder Head:**
- Number : Three
Disposition : Vertical, in-line
Bore/stroke, (mm) : 100 / 118
Capacity as specified by the applicant, (cc) : 2780
Compression ratio, (apa) : 18.2 :1(± 0.2)
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 / 0.40
- Exhaust valve, (mm) : 0.30/ 0.40

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15. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

15.1 On the basis of test conducted the performance results have been summarized as evaluative (mandatory) / non-evaluative (non-mandatory) parameters 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:

Sl. No.	Characteristic	Category (Evaluative / Non-Evaluative)	Requirements as per IS: 12207-2019	Values declared by the applicant/ (D) Requirement (R)	As observed	Whether meets the require- ments (Yes/No)
1	2	3	4	5	6	7
15.1.1	PTO Performance:					
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: $\pm 5\%$ for PTO power and or engine power > 26 kW. $\pm 10\%$ for PTO power and or engine ≤ 26 kW.	24.6 (D)	24.8	Yes
b)	Power at rated engine speed, (kW)	Non-Evaluative	-do-	24.6 (D)	24.8	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% max.	265 (D)	237	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non-Evaluative	$\pm 8\%$	157(D)	150.3	Yes
e)	Back-up torque, percent	Evaluative	12 percent	12% (D) 12% (R) Minimum	27	Yes
f)	Maximum operating temperature, ($^{\circ}\text{C}$)					
	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.	132 (D)	113	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.	118 (D)	99	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions.	1% of SFC 2.40 (R)	0.325	Yes
h)	Smoke level, (m^{-1})	Evaluative	Maximum light absorption coefficient of 3.25 per meter or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR).	3.25 per meter Maximum (R)	0.08 per meter	Yes

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1	2	3	4	5	6	7	
15.1.2	Drawbar performance:						
a)	Max. drawbar pull with ballasted corresponding to 15 percent wheel slip, (kN)	Non-Evaluative	Minimum 70% of static mass of tractor with ballast.	18.23 (D) 17.84 (R) Min	20.80	Yes	
b)	Max. drawbar pull with unballasted as the case may be corresponding to 15 percent wheel slip, (kN)	Evaluative	Minimum 70% of static mass of tractor without ballast or with standard ballast, as the case may be.	13.59 (D) 13.75 (R) Min	15.28	Yes	
c)	Maximum drawbar power with unballast, (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.	19.7 (D) 19.8 (R) Minimum	21.9	Yes	
d)	Maximum transmission oil temperature, (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	130 (D)	61	Yes	
15.1.3	Power lift and hydraulic pump performance:						
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	Tolerance of ± 10%	12.00 (D)	13.16	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.	5.96 (D) 5.80 (R) Minimum	12.10	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) Maximum	30	Yes

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1	2	3	4	5	6	7	
15.1.4	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)	8.66	Yes
	2)	Hot brake	Evaluative	10	10 (R)	8.94	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² (N)		Evaluative	600	600 (R) Maximum	324 to 489	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
15.1.5	Noise measurement:						
a)	Maximum ambient noise emitted by the tractor, dB(A)		Evaluative	As per CMVR	88 (R)	82	Yes
b)	Maximum noise at operator's ear level, dB(A)		Evaluative	As per CMVR	96 (R)	92	Yes
15.1.6	Amplitude of mechanical vibrations at:						
	1)	Left foot rest	Non Evaluative	100 microns (max)	100(R)	67	Yes
	2)	Right foot rest				146	No
	3)	Seat (with driver seated)				57	Yes
	4)	Steering wheel				96	Yes
15.1.7	Air cleaner Oil Pull-Over:						
	Maximum air cleaner oil pull over, (%)		Evaluative	0.25% (Maximum)	Dry type air cleaner fitted	Not applicable	
15.1.8	Haulage requirements:						
a)	Gross mass of the trailers, (tonnes):						
	Two wheel		Non-	--	5.5 (D)	5.5	Yes
	Four wheel		Evaluative	--	6.5 (D)	6.5	Yes
b)	Distance travelled / liter of fuel consumption, (km/l):						
	Two wheel		Non-	--	4.5 to 7 (D)	5.67 to 5.83	Yes
	Four wheel		Evaluative	--	4.5 to 7 (D)	5.67 to 5.91	Yes
c)	Fuel consumption, (ml/km/tonne) :						
	Two wheel		Non-	--	20 to 30 (D)	32.1 to 32.2	No
	Four wheel		Evaluative	--	20 to 30 (D)	26.0 to 27.2	Yes

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1	2	3	4	5	6	7	
15.1.9	Wetland cultivation (Puddling Operation):						
	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 (R)	No ingress of water and / or mud was observed during ICT test vide test report no. T-991/1515 /2015	Yes
	1)	Clutch assembly	-do-				
	2)	Brake housings	-do-				
	3)	Front axle hubs	-do-				
	4)	Engine oil	-do-				
5)	Transmission oil	-do-					
15.1.10	Safety features:						
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, silencer, hydraulic pipes (As per IS 12239 (Part-2))	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)	Meets the requirement	Yes		
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)	Meets the requirement	Yes		
f)	Specifications of linkage drawbar	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 gears, Kmph	Evaluative	Should not exceed 20 Kmph	12.40 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 provided	Not applicable	

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1	2	3	4	5	6	7	
15.1.11	Labeling of tractors (Provision of labeling 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. MM YY 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.	International Tractors Limited	Yes	
	2)	Model	Evaluative		Sonalika International DI -35 RX CM Plus	Yes	
	3)	Month & Year of manufacture	Evaluative		06/2021	Yes	
	4)	Engine number	Evaluative		3100FL14F10678 24F3	Yes	
	5)	Chassis number	Evaluative		HYASR1073681S3	Yes	
	6)	Maximum PTO power, (kW)	Evaluative		24.6	Yes	
15.1.12	Discard limit for:						
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by the printed literature	100.346	100.02 to 100.04	Yes	
(b)	Piston & cylinder liner clearance at skirt, (mm)	Non-Evaluative		0.450	0.105 to 0.122	Yes	
(c)	Piston diameter at skirt, (mm)	Non-Evaluative		99.20	99.908 to 99.935	Yes	
(d)	Ring end gap, (mm):						
	-	Top comp. ring.	Evaluative	-do-	2.0	0.35 to 0.45	Yes
	-	2 nd comp. ring.		-do-	2.0	0.75 to 0.90	Yes
	-	Oil ring.		-do-	2.0	0.45 to 0.55	Yes
(e)	Ring groove clearance, (mm):						
	-	Top comp. ring.	Evaluative	--Tapped--		--	
	-	2 nd comp. ring.		-do-	0.20	0.045 to 0.061	Yes
	-	Oil ring.		-do-	0.20	0.015 to 0.045	Yes
(f)	Clearance of main bearings, (mm):						
	-	Diametrical clearance	Evaluative	-do-	0.35	0.063 to 0.105	Yes
	-	Crankshaft end float			0.70	0.27	Yes
(g)	Clearance of big end bearings, (mm):						
	-	Diametrical	Evaluative	-do-	0.35	0.053 to 0.098	Yes
	-	Axial	Evaluative	-do-	0.1.0	0.20	Yes
(h)	Clearance between king pin and bush, (mm)		Non-Evaluative	-do-	1.00	0.015 to 0.040	Yes
(i)	Clearance between centre pin and bush, (mm)		Non-Evaluative	-do-	1.00	0.057 to 0.087	Yes

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1	2	3	4	5	6	7
15.1.13	Literature (Submission to test agency)					
(a)	Operator manual	Evaluative	The printed literature in booklet form should be provided as per IS 8132 and should submit along with the test sample	Provided	Provided	Yes
(b)	Parts Catalogue	Evaluative		Provided	Provided	Yes
(c)	Workshop/ Service manual	Evaluative		Provided	Provided	Yes
15.1.14	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		Not fitted	Not applicable
15.1.15	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor		Provided	Yes
15.1.16	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR		Provided	Yes

15.2 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 one 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 four, that is, (1 major + 3 minor) or 4 minor breakdowns.	None	Yes

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15.3 Salient Observations:

15.3.1 Laboratory tests:

15.3.1.1 Hydraulic performance test:

- i) The maximum tilt angle of mast from vertical was recorded as 4.4 degree against the minimum requirement of 10 degree as per IS: 12224:1987. This should be looked into for necessary correction in the hydraulic system.

15.3.1.2 Mechanical vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter – 9 of this test report is on higher side. This calls for dampening down of vibrations especially on Right Foot Rest, to improve the operational comfort and service life of components.

15.3.1.3 Haulage test:

The fuel consumption with two wheel trailer was recorded as 32.1 to 32.2 ml/km/tonne against the declaration of 20 to 30 ml/km/tonne & does not meet the requirement of IS:12207-2019. This should be looked into for necessary corrective action.

15.3.1.4 Three point linkage:

- i) The lateral distance from lower hitch point to centre line of tractor was observed 364 mm, which does not meet the requirement of IS: 4468 -1997 (Part-1). This should be looked into for necessary corrective action.
- ii) Some of the parameters conform to Cat. I and some of them conform to Cat. II. Keeping in view the spirit of standardization, necessary improvements may be incorporated.

15.4 Maintenance / Service Problems:

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

15.5 Recommendation with regard to safety on tractor:



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

- i) Provision for safe start of the engine.
- ii) Fuel shut-off knob should be remain in the “STOP” position.
- iii) Provision for spark arresting device in exhaust system.
- iv) Differential lock.
- v) The working clearance around the position control lever
- vi) PTO master shield should be provided on tractor.
- vii) Length of operator’s seat from seat index point.
- viii) Width of operator’s seat
- ix) Inclination of operator’s seat towards rear direction.
- x) Vertical retainer on inner side of clutch pedal.
- xi) Hand hold for easy mounting.

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- 15.6 Adequacy of Literature supplied with machine:**
- 15.6.1** The following literature of "International Tractors Limited, Sonalika International DI – 35 RX CM Plus" was supplied with test sample for reference during the test:
- a) Operator's manual
 - b) Service manual (Part I and II).
 - c) Spare part's catalogue (Part I and II).
- 15.6.2** The operator manual may be brought out for the guidance of users and service personnel as per IS:8132-1999 incorporating, inter alia, the following:
- i) Safe hitch height of the trailer.
 - ii) Coolant water ratio.

TESTING AUTHORITY:

C.V. CHIMOTE TEST ENGINEER	
P. K. PANDEY DIRECTOR	

Draft test report is compiled by: **Nitesh Kumar Verma**, Agricultural Engineer.

16. Applicant's Comments

Nil

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ANNEXURE- I

TRACTOR RUN HOURS DURING TEST

A.	LABORATORY AND TRACK TESTS:	HOURS
1.	Running-in	41.57
2.	PTO performance test	11.31
3.	Drawbar performance test	17.18
4.	Power lift and hydraulic pump performance test	2.00
5.	Brake test	3.00
6.	Noise measurement	1.25
7.	Mechanical vibration test	0.67
8.	Theoretical speed test	2.00
B.	Haulage Test	4.94
C.	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	4.71
	TOTAL:	88.63