

(यह परीक्षण रिपोर्ट 30/04/2025 तक वैध है। / THIS TEST REPORT IS VALID UP TO : 30/04/2025)



**INTERNATIONAL TRACTORS LIMITED,  
SONALIKA INTERNATIONAL DI-47 RX HEAVY DUTY 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

(Deptt. of Agricultural, Cooperation & Farmer's 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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## 1. SPECIFICATIONS

<b>1.1 Tractor:</b>	Make	: International Tractors Limited
	Model	: Sonalika International DI-47 RX Heavy Duty
	Brand name	: None
	Variant, if any	: None
	Type	: Four wheeled, rear wheel driven, unit construction, general purpose agricultural Tractor.
	Year of manufacture	: 05   19
	Chassis number	: FZVSS 847949S3
	Country of origin	: India
<b>1.2 Engine:</b>	Make	: International Tractors Limited
	Model	: 3102IL
	Type	: Four stroke, naturally aspirated, water cooled, direct injection, diesel engine.
	Serial number	: 3102IL93D844914F5
	Year of manufacture	: 2019
	Country of origin	: India
<b>1.2.1 Engine speed (rpm), (Manufacturer's recommended production settings):</b>	- Maximum speed at no load	: 2200 to 2400
	- Low idle speed	: 650 to 750
	- Speed at maximum torque	: 1100 to 1300
	<b>Rated speed, (rpm):</b>	
	- For PTO use	: 2100
	- For drawbar use	: 2100
<b>1.3 Cylinder &amp; Cylinder Head:</b>	Number	: Three
	Disposition	: Vertical, in-line
	Bore/stroke, (mm)	: 102 / 118
	Capacity as specified by the applicant, (cc)	: 2893
	Compression ratio	: 18.4 (±0.2) :1
	Type of cylinder head	: Individual, Inline
	Type of cylinder liners	: Wet, replaceable
	Type of combustion chamber	: Direct injection, re-entrant
	Arrangement of valves	: Overhead, Inline
	<b>Valve clearance (cold/hot):</b>	
	- Inlet valve, (mm)	: 0.30 / 0.30
	- Exhaust valve, (mm)	: 0.40 / 0.40
<b>1.4 Fuel System:</b>	Type of fuel feed system	: Gravity and force feed
<b>1.4.1 Fuel tank:</b>	Capacity, (l)	: 54.0
	Location	: Above clutch housing
	Provision for draining of sediments/ water	: Drain plug provided.
	Material of fuel tank	: M.S. Sheet



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#### 14. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

14.1 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 requirements (Yes/No)
1	2	3	4	5	6	7
<b>14.1.1</b>	<b>PTO Performance :</b>					
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 $\leq 26$ kW.	30.52 (D)	31.7	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	-do-	30.52 (D)	31.7	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Evaluative	+ 10% max.	272 (D)	265	Yes
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	$\pm 8\%$	168 (D)	172.6	Yes
e)	Back-up torque, percent	Evaluative	12 percent	12% (D) 12% (R) Minimum	19.9	Yes
f)	Maximum operating temperature. ( $^{\circ}$ 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.	130 (D)	110	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)	105	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under High ambient conditions.	2.65 Maximum (R)	0.39	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 Maximum (R)	0.31	Yes



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1	2	3	4	5	6	7	
<b>14.1.2 Drawbar performance :</b>							
a)	Max. drawbar pull with ballasted corresponding to 15 percent wheel slip, (kN)	Non Evaluative	Minimum 70% of static mass of tractor with ballast.	16.76 (D)	21.56	Yes	
				17.71 Minimum (R)			
b)	Max. drawbar pull without ballasted 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.	13.52 (D)	18.49	Yes	
				13.52 (R) Minimum			
c)	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.	24.9 (D)	28.9	Yes	
				25.4 (R) Minimum			
d)	Maximum transmission oil temperature (°C)	Evaluative	The declared value should not exceed the maximum value specified by oil company	132 (D)	75	Yes	
<b>14.1.3 Power lift and hydraulic pump performance :</b>							
a)	Maximum lifting capacity throughout the range of lift, (kN):						
	1)	At hitch points	Evaluative	Tolerance of ± 10%	15.0 (D)	15.09	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.	7.48 (D) 7.46 (R) Minimum	12.68	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	22	Yes	
<b>14.1.4 Brake performance at 25 kmph:</b>							
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)	8.30	Yes
	2)	Hot brake	Evaluative	10	10 (R)	8.42	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s <sup>2</sup> (N)	Evaluative	600	600 (R) Maximum	306 to 402	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	



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1	2	3	4	5	6	7
<b>14.1.5</b>	<b>Noise measurement :</b>					
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)	94	Yes
<b>14.1.6</b>	<b>Amplitude of mechanical vibrations at:</b>					
	1) Left foot rest	Non Evaluative	100 microns (max)	100(R)	132	No
	2) Right foot rest				224	No
	3) Seat (with driver seated)				48	Yes
	4) Steering wheel				346	No
<b>14.1.7</b>	<b>Air cleaner Oil Pull-Over:</b>					
	Maximum air cleaner oil pull over, (%)	Evaluative	0.25% (Maximum)	Dry type air cleaner fitted	Not applicable	
<b>14.1.8</b>	<b>Haulage requirements :</b>					
a)	Gross mass of the trailers, (tones):					
	Two wheel	Non Evaluative	--	4.5 (D)	4.5	Yes
	Four wheel	Non Evaluative	--	5.5 (D)	5.5	Yes
b)	Distance travelled / liter of fuel consumption, (km/l):					
	Two wheel	Non Evaluative	--	4.50 to 6.00 (D)	5.51 to 5.74	Yes
	Four wheel	Non Evaluative	--	4.50 to 6.00 (D)	5.17	Yes
c)	Fuel consumption (ml/km/tonne):					
	Two wheel	Non Evaluative	--	28.0 to 38.0 (D)	38.68 to 40.30	No
	Four wheel	Non Evaluative	--	28.0 to 38.0 (D)	35.17	Yes
<b>14.1.9</b>	<b>Wetland cultivation :</b>					
	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 during ICT vide test report no T-957/1475/2015 (March, 2015)	Yes
	1) Clutch assembly	-do-				
	2) Brake housings	-do-				
	3) Front axle hubs	-do-				
	4) Engine oil	-do-				
	5) Transmission oil	-do-				
<b>4.1.10</b>	<b>Safety features :</b>					
a)	Guards against moving and hot parts	Evaluative	Belt drives, pulleys, 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)	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



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1	2	3	4	5	6	7		
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 meets the requirement		No		
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	12.0 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		
<b>14.1.10</b>	<b>Labelling of tractors (Provision of labelling plate):</b>							
	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: 5px 0;"><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 Ltd.		Yes
MM	YY							
	2) Model	Evaluative		Sonalika International DI- 47 RX Heavy Duty		Yes		
	3) Month & Year of manufacture	Evaluative		05	19	Yes		
	4) Engine number	Evaluative		3102IL93D844914F5		Yes		
	5) Chassis number	Evaluative		FZVSS847945S3		Yes		
	6) Maximum PTO power, (kW)	Evaluative		30.52		Yes		
	7) Specific fuel consumption (g/kWh)	Evaluative	272		Yes			
<b>14.1.11</b>	<b>Discard limit for:</b>							
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by the printed literature	102.346 (D)	102.002 to 102.022	Yes		
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45 (D)	0.099 to 0.112	Yes		
(c)	Piston diameter at the skirt, (mm)	Non Evaluative		101.8	101.910 to 101.920	Yes		



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1	2	3	4	5	6	7
(d)	<b>Ring end gap (mm):</b>					
	- Top comp. ring.	Evaluative	-do-	2.0 (D)	0.55 to 0.60	Yes
	- 2 <sup>nd</sup> comp. ring.		-do-	2.0 (D)	0.80 to 0.95	Yes
	- Oil ring.		-do-	2.0 (D)	0.60 to 0.65	Yes
(e)	<b>Ring groove clearance (mm):</b>					
	- Top comp. ring.	Evaluative	-do-	0.20 (D)	Tapered	Yes
	- 2 <sup>nd</sup> comp. ring.		-do-	0.20 (D)	0.063 to 0.075	Yes
	- Oil ring.		-do-	0.20 (D)	0.051 to 0.056	Yes
(f)	<b>Clearance of main bearings (mm):</b>					
	- Diametrical clearance	Evaluative	-do-	0.35 (D)	0.092 to 0.116	Yes
	- Crankshaft end float	Evaluative		0.70 (D)	0.10	Yes
(g)	<b>Clearance of big end bearings, (mm):</b>					
	- Diametrical	Evaluative	-do-	0.35 (D)	0.074 to 0.91	Yes
	- Axial	Evaluative	-do-	1.00 (D)	0.25	Yes
(h)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	1.00 (D)	0.094 to 0.137	Yes
(i)	Clearance between centre pin and bush, (mm)	Non Evaluative	-do-	1.00 (D)	0.121 to 0.146	Yes
14.1.11	<b>Literature (Submission to test agency)</b>					
(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
14.1.12	<b>Fitment of Roll Over Protective Structures (ROPS):</b>					
	For tractor having more than 1150 mm rear track width	Evaluative	ROPS should meet the requirement of IS:1182 or OECD code or equivalent International Standard	--	Not Applicable	Not Applicable
14.1.13	Standard Accessories	Evaluative	Trailer hitch, front tow hook, linkage drawbar should be provided with tractor	--	Provided	Yes
14.1.14	Accessories (optional)	Non Evaluative	Ballast weight, if fitted, should meet the requirement of CMVR	--	Provided	Yes
14.2	<b>CATEGORY OF BREAKDOWNS / DEFECTS ( As per clause 5.0 of IS:12207-2019):</b>					
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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**14.3****Salient Observations:****14.3.1****Laboratory tests:****14.3.1.1****PTO Performance Test:**

- i) The maximum power in case of previous & present sample were observed as **32.2 & 31.7 kW** against the declaration of **30.5 kW**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power in case of previous & present sample was recorded as **247 & 265 g/kWh** against the declaration of **265 g/kWh**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iii) The maximum equivalent crankshaft torque was recorded as **172.6 N-m** against the declaration of **168 N-m**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.
- iv) The backup torque is **19.9 %**, which meets the requirement of IS: 12207-2019 with regard to tolerance limit.

**14.3.1.2****Drawbar performance test:**

- i) Maximum drawbar pull with unballast corresponding to 15 percent wheel slip, (kN) was recorded as **18.49 kN** against the minimum requirement of **13.53 kN**. Which meet the minimum requirement of IS: 12207-2019.
- ii) Maximum drawbar power with unballast was recorded as **28.9 kW** against the minimum requirement of **25.4 kW**. Which meet the minimum requirement of IS: 12207-2019.

**14.3.1.3****Hydraulic performance test:**

- i) Maximum lifting capacity throughout the range of lift at hitch point and standard frame was recorded as **15.09 kN & 12.68 kN** respectively against the declaration of **15.0 kN & 7.48 kN** respectively. Which meet the evaluative requirement of IS: 12207-2019.

**14.3.1.4****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 & foot rest to improve the operational comfort and service life of components.

**14.3.1.5****Three point linkage:**

- i) The dimension of lateral distance from lower hitch point to centre line of tractor does not meet the requirement of IS: 4468 (Part I) – 1997. This is recommended to look 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 improvement may be incorporated.

**14.4****Maintenance / Service Problems:**

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

**14.5****Recommendation with regard to safety on tractor:**

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

- i) There should be provision for spark arresting device in exhaust system.
- ii) Provision of power take off master shield has not been provided.
- iii) Vertical retainness should be provided on inner side of clutch pedal
- iv) Safety switch to start the engine is not provided



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- v) Fuel shut-off lever does not remain in stop position without application of sustained manual effort.
- vi) Working clearance around the operator's seat & tipping trailer is less than the minimum requirement.

**14.6 Adequacy of Literature supplied with machine:**

**14.6.1** The supplied literature was found adequate

- a) Operator's manual of tractor model Sonalika International DI-47 RX Heavy Duty tractor.
- b) Spare Parts catalogue of tractor model Sonalika International DI-47 RX Heavy Duty.
- c) Service Manual part I & part-II of tractor model Sonalika International DI-47 RX Heavy Duty tractor.

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

**15. Citizen charter**

Test duration under citizen charter	Duration of Test	Whether the report released within time frame given in the citizen charter	Remark
10 Months	08 Months (July, 2019 to February, 2020)	Yes	None

**TESTING AUTHORITY:**

C.S. RAGHUWANSHI  
AGRICULTURAL ENGINEER

C.V. CHIMOTE  
TEST ENGINEER

J.J.R. NARWARE  
DIRECTOR

The report compiled by: **Sh. Shivkumar Sharma**, Senior Technical Assistant.

**16. APPLICANT'S COMMENTS**

--Nil--



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**ANNEXURE- I**

**TRACTOR RUN HOURS DURING TEST**

<b>A.</b>	<b>LABORATORY AND TRACK TESTS</b>	<b>HOURS</b>
1.	Running-in	40.0
2.	PTO performance test	10.8
3.	Drawbar performance test	16.3
4.	Power lift and hydraulic pump performance test	1.2
5.	Brake test	1.0
6.	Noise measurement	1.8
7.	Mechanical vibration test	1.0
8.	Nominal speed test	1.1
<b>B.</b>	<b>HAULAGE TEST</b>	5.2
<b>C.</b>	Miscellaneous test and other run hours including idle run, transportation, trials and preparation for test	5.9
<b>TOTAL:</b>		<b>84.3</b>