



SONALIKA INTERNATIONAL, DI - 47 RX 4WD WL TRACTOR



सत्यमेव जयते

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, CO-OPERATION AND FARMERS WELFARE)

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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Manufacturer	: M/s. International Tractors Limited Vill. Chak Gujran, P.O. Piplanwala, Jalandhar Road, Hoshiarpur – 146 022 (Punjab)
Test requested by (applicant)	: The manufacturer
Selected for test by	: Applicant
Place of running-in	: At manufacturer's works
Duration of said running-in (h):	
- Engine	: 35
- Transmission	: Nil
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	: Sonalika International
Model	: DI-47 RX 4WD WL
Variants, if any	: None
Brand name	: RX
Type	: Four Wheeled, Four Wheel Driven, General Purpose Agricultural Tractor.
Year of manufacture	: 2015
Chassis number	: CZVDU531850S3
Country of Origin	: INDIA
1.2 Engine:	
Make	: SONALIKA
Model	: 3102 IL
Type	: Four stroke, naturally aspirated, liquid cooled, direct injection, diesel engine.
Serial number	: 3102IL53K526638F5
Engine speed (Manufacturer's recommended production setting), (rpm) :	
- Maximum speed at no load,(rpm)	: 2200 to 2400
- Low idle speed, (rpm)	: 650 to 750
- Speed at max. torque, (rpm)	: 1100 to 1300
Rated speed, (rpm):	
- For PTO use	: 2100
- For drawbar use	: 2100
1.3 Cylinder & Cylinder Head:	
Numbers	: Three
Disposition	: Vertical, inline
Bore/stroke, (mm)	: 102/118 (apa)



Any marked wear of king pin bushes : Normal
 Clearance between king pins and bushes, mm : Not Applicable
 Condition of bushes for front axle : Normal
 Condition of seals for front axle assemblies : Normal
 Any visual damage, pitting & chipping of front axle transmission gear teeth : None
 Clearance between centre pin and bush, mm : 0.15 to 0.17 | Against discard limit of 1.00 mm

14.6 **Steering system:**
 Visual condition of the components of complete steering assembly : Normal

14.7 **Starter motor & Alternator:**
 Presence of soil/oil in housing : None
 Condition of bearings and other Components : Normal

15. ADJUSTMENTS, DEFECTS, BREAKDOWNS AND REPAIRS

S. No.	Adjustments/Defects/Breakdowns and repairs	Category of breakdown	Tractor run hours
1	2	3	4
1.	During the break performance test, the 4WD/2WD engaging lever was not working. Thereafter, the threaded linkage of 4WD was adjusted to bring the lever in working condition and test conducted.	--	5.9

16. SUMMARY OF OBSERVATIONS, COMMENTS & RECOMMENDATIONS

16.1 Evaluative (mandatory) / Non-evaluation (Non-mandatory) parameter applicable for qualifying Minimum Performance criteria as per Clause-4 (Table-1) of IS: 12207-2014 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: 12207-2014	Values declared by the applicant(D)/ Requirement (R)	As observed	Whether meets the requirements (Yes/No.)
1	2	3	4	5	6	7
16.1.1	PTO Performance :					
a)	Maximum power under 2 h test, (kW) (Natural ambient condition)	Evaluative	Declared value to be achieved with a tolerance of: -5 / +10% for PTO power >26kW. -7.5/+10% for PTO power ≤ 26kW -do-	30.52 (D)	29.7	Yes
b)	Power at rated engine speed, (kW)	Non Evaluative	+ 5%	30.52 (D)	29.7	Yes
c)	Specific fuel consumption corresponding to maximum power, (g/kWh)	Non Evaluative		272 (D)	261	Yes

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1	2	3	4	5	6	7
d)	Maximum equivalent crankshaft torque, (Nm)	Non Evaluative	± 8%	168 (D)	172.3	Yes
e)	Back-up torque, percent	Non Evaluative	10 percent, min.	10 percent, min (R)	27.63	Yes
Maximum operating temperature (°C):						
1)	Engine oil	Non 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)	105	Yes
2)	Coolant (water)	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)	107	Yes
g)	Engine oil consumption, (g/kWh)	Evaluative	Not exceeding 1% of SFC at max. power under high ambient conditions	2.61 (R)	0.28	Yes
h)	Smoke level	Evaluative	Maximum light absorption coefficient of 3.25 per metre or equivalent BOSCH No. 5.2 or 75 Hatridge value (As per CMVR)	1% of SFC, max. (D) BOSCH No. 5.2	0.24 per meter	Yes
16.1.2 Drawbar performance :						
a)	Maximum drawbar pull with ballast corresponding to 15 percent wheel slip, (kN).	Non Evaluative	Minimum 65% of static mass of tractor with ballast	17.15 (D)	24.06	Yes
b)	Maximum drawbar pull without ballast corresponding to 15 percent wheel slip, (kN).	Evaluative	Minimum 65% of static mass of tractor without ballast	18.10 (R) Minimum		
c)	Maximum drawbar power without ballast (kW).	Evaluative	Minimum 80% of PTO power as referred in Sl. No. i) a) of PTO performance in case of tractors having total static mass >1500 kg. Minimum 75% of PTO power as referred in Sl. No. i) a) of PTO performance in case of light weight tractors. Minimum 75% of the engine power as referred in Sl. No. i) a) of PTO performance in case of tractors which do not have a PTO shaft.	14.18 (D)	19.91	Yes
d)	Maximum transmission oil temperature (°C)	Non Evaluative	The declared value should not exceed the maximum value specified by oil company.	14.18 (R) Minimum	25.9	Yes
16.1.3 Power lift and hydraulic pump performance :						
a)	Maximum lifting capacity throughout the range of lift, (kN):	Non Evaluative	[Tolerance of minus 10%]	24.41 (D)	23.8 (R) Minimum	Yes
1)	At hitch points	Non Evaluative		130 (D)	88	Yes
				16 (D)	12.86	No



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1	2	3	4	5	6	7
	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	8 (D) 6.99 (R) Minimum	11.00	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)	65	No
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 road ballast, (m):		10	10 (R)	8.46	Yes
	1) Cold brake	Evaluative	10	10 (R)	8.48	Yes
	2) Hot brake	Evaluative	600	600 (R)	328 to 331	Yes
b)	Maximum force exerted on the brake pedal to achieve a deceleration of 2.5 m/s ² , (N)	Evaluative	600	600 (R)	328 to 331	Yes
c)	Whether parking brake is effective at a force of 600 N at foot pedal(s) or 400 N at hand lever	Evaluative	Yes/No	Yes (R)	Yes	Yes
16.1.5 Noise measurement :						
a)	Maximum ambient noise emitted by the tractor, dB(A)	Evaluative	As per CMVR	88 (R)	83	Yes
b)	Maximum noise at operator's ear level, dB(A)	Evaluative	As per CMVR	96 (R)	93	Yes
16.1.6 Amplitude of mechanical vibrations at :						
	1) Left foot rest	Non Evaluative	100 microns (max)	100 (R)	220	No
	2) Right foot rest			100 (R)	220	No
	3) Seat (with driver seated)			100 (R)	150	No
	4) Steering wheel			100 (R)	170	No
16.1.7 Air cleaner:						
	Air cleaner oil pull over, (%)	Non Evaluative	0.25 % (maximum)	Dry type air cleaner provided	NA	NA
16.1.8 Haulage requirements :						
a)	Gross mass of the trailers, (tones):		--	5.5 (D)	5.5	Yes
	1) Two wheel	Non Evaluative	--	6.0 (D)	6.0	Yes
	2) Four wheel		--	--	--	--
	Distance travelled / litre of fuel consumption, (km/l):		--	4.5 to 6.0 (D)	4.49 to 4.50	No
b)	Distance travelled / litre of fuel consumption, (km/l):		--	4.5 to 6.0 (D)	4.35 to 4.40	No
	1) Two wheel	Non Evaluative	--	--	--	--
	2) Four wheel		--	--	--	--

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1	2	3	4	5	6	7
c)	Fuel consumption, (ml/km/tonne):		--	28.0 to 38.0 (D)	40.4	No
	1) Two wheel	Non	--	28.0 to 38.0 (D)	37.9 to 38.3	No
	2) Four wheel	Evaluative				
16.1.9	Wetland cultivation (Puddling Operation):					
	Sealing for the following assemblies	Evaluative	The assemblies identified 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 water and/or mud was observed	Yes
	1) Clutch assembly	-do-				
	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, hydraulic pipes (As per IS 12239 Part 2)	--	Meets the requirement	Yes
b)	Lighting arrangement	Evaluative	As per CMVR	--	Meets the requirements	Yes
c)	Seating requirements (Tractors having more than 1150 mm 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	Non Evaluative	Should meet the requirements of IS 4931 (as amended from time to time)	--	Does not meet the requirement	No
e)	Dimensions of three point linkage	Non Evaluative	Should meet the requirements of IS 4468 (Part 1) (as amended from time to time)	--	Does not meet the requirement	No
f)	Specifications of linkage drawbar	Non Evaluative	Should meet the requirements of IS 12953 (as amended from time to time)	--	Meets the requirements	Yes
	Specifications of swinging drawbar	Non Evaluative	Should meet the requirements of IS 12362 (Part 3) (as amended from time to time)	--	Not provided	NA
16.1.11	Labeling of tractors (Provision of labeling plate):					
	1) Make	Evaluative	Should conform to the requirements of CMVR	--	INTERNATIONAL TRACTORS LIMITED	Yes
	2) Model	Evaluative		--	DI-47 RX 4WD WL	Yes
	3) Year of manufacture	Evaluative		--	2015	Yes
	4) Engine serial number	Evaluative		--	3102IL53K526638F5	Yes
	5) Chassis number	Evaluative		--	CZVDU531850S3	Yes

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1	2	3	4	5	6	7
	6) Declaration of PTO power, (kW)	Evaluative		--	30.52	Yes
16.1.12	Discard limit for:					
(a)	Cylinder bore diameter, (mm)	Evaluative	To be specified by the manufacturer and supported by printed literature.	102.346	102.02 to 102.08	Yes
(b)	Clearance between piston & cylinder liner at skirt, (mm)	Non Evaluative		0.45	0.137 to 0.156	Yes
(c)	Ring end gap (mm):					
	- Top comp. ring.	Evaluative	-do-	2.0	1.00	Yes
	- 2 nd comp. ring.		-do-	2.0	0.60 to 0.70	Yes
	- Oil ring.		-do-	2.0	0.70 to 0.80	Yes
(d)	Ring groove clearance (mm):					
	- Top comp. ring.	Evaluative	-do-	0.20	Taper rings	--
	- 2 nd comp. ring.		-do-	0.20	0.057 to 0.083	Yes
	- Oil ring.		-do-	0.20	0.041 to 0.047	Yes
(e)	Clearance of main bearings (mm):					
	- Diametrical clearance	Evaluative	-do-	0.20	0.041 to 0.081	Yes
	- Crankshaft end float	Evaluative	-do-	0.60	0.25	Yes
(f)	Clearance of big end bearings, (mm):					
	- Diametrical	Evaluative	-do-	0.20	0.081 to 0.097	Yes
	- Axial	Evaluative	-do-	0.60	0.25	Yes
(g)	Clearance between king pin and bush, (mm)	Non Evaluative	-do-	1.00	NA	--
(h)	Clearance between center pin and bush, (mm)	Non Evaluative	-- do--	1.00	0.15 to 0.17	Yes
16.1.13	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

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16.1.14 CATEGORY OF BREAKDOWNS / DEFECTS :					
S. No.	Characteristic	Category (Evaluative / Non Evaluative)	Requirements as per IS: 12207-2014	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 five 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

16.2 Optional requirements as per Clause-4 (Table-2) of IS:12207-2014:				
S. No.	Characteristic	Requirements as per IS: 12207-2014	As observed	Whether meets the requirements (Yes/No.)
1.	Fitment of ROPS	With a provision for fitment of ROPS. If ROPS fitted it should meet the requirement of IS: 11821-1992.	Not provided ROPS not fitted	No Not applicable
2.	Accessories	Trailer hitch, front tow hook may be provided.	Trailer hitch provided Front tow hook provided	No

- 16.3 Conformity with following IS:**
- i) Guide lines for declaration of power and specific fuel consumption and labeling of agricultural tractors (First revision) [IS 10273:1987 (Reaffirmed in March, 2009)] : **Conforms**
 - ii) Agricultural tractors – Rear mounted power take-off - Types 1, 2 and 3 (third revision) [IS: 4931-1995 (Reaffirmed in March, 2009)] : **Does not conform**
 - iii) Agricultural wheeled tractors - Three-point linkage: Part 1 Categories 1, 2, 3 & 4 (Fourth Revision) [IS 4468 (Part-1):1997/ ISO 730-1:1994 (Reaffirmed in March, 2009)] : **Does not conform**
 - iv) Drawbar for agricultural tractors – Link type [IS 12953:1990 (Reaffirmed in March, 2007)] : **Conforms**
 - v) Agricultural tractors - Operator's seat technical requirement [IS 12343 -1998 (First revision) (Reaffirmed in March, 2009)] : **Does not conform**
 - vi) Guide for safety & comfort of operator of agricultural tractors: Part 1 General requirements (first revision): [IS 12239 (PT-1) 1996 (Reaffirmed in February, 2012)/ISO 4254-1:1989] : **Does not conform**
 - vii) Tractors and machinery for agriculture and forestry, powered lawn and garden equipment – Symbols for operator controls and other displays [IS: 6283 (Part-1) – 2006 (Reaffirmed in March, 2009) and IS: 6283 (Part-2)-2007 (Reaffirmed in March, 2009)]/ISO 3767-2:1991] : **Conforms**



- viii) Tractors and machinery for agriculture and forestry – : Does not conform
Technical means for ensuring safety Part 2: Tractors
(first revision) [(IS 12239 (PT-2) 1999) (Re-affirmed
in March, 2009)]
- ix) Guide lines for location and operation of operator : Does not conform
controls on agricultural tractors and machinery (first
revision) (IS: 8133 – 1983) (Re-affirmed in March,
2009)
- x) Agricultural Tractor & Machinery Lighting device for : Conforms
travel on public roads (IS: 14683-1999) (Re-affirmed
in March, 2009)

16.4 Salient Observations:

16.4.1 Laboratory tests:

16.4.1.1 PTO Performance:

- i) The maximum PTO power was observed as **29.7 kW** against the declaration of **30.52 kW** which meets the requirement of IS: 12207-2014 with regard to tolerance limit.
- ii) The specific fuel consumption corresponding to maximum power was recorded as **261 g/kWh** against the declaration of **272 g/kWh**, which is within the tolerance limit of IS: 12207-2014.
- iii) The backup torque is **27.63 %**.

16.4.1.2 Drawbar performance:

The creeping of RHS tyre over rim was recorded as 15 mm during ten hours drawbar performance test. This should be looked into for necessary corrective action.

16.4.1.3 Hydraulic Performance:

- i) The lifting capacity at lower hitch point was observed as **12.86 kN** which is less than the declaration of **16.00 kN** which doesn't meet the requirement of IS 12207:2014. This should be looked into for necessary corrective action.
- ii) The maximum drop in the height of point of application of force was recorded as **65 mm** which is higher than the maximum limit of **50 mm** as per IS: 12207 - 2014. This should be looked into for necessary corrective action.

16.4.1.4 Mechanical Vibration:

The amplitude of mechanical vibration on various assemblies marked as (*) in Chapter-8 of this test report is on very higher side, especially at the steering control wheel, foot rests & driver seat. This calls for dampening down of vibrations to improve the operational comfort and service life of components.

16.4.1.5 Haulage requirements:

The distance travelled per liter & specific fuel consumption with two and four wheel trailer does not meet the values declared by the applicant. This should be looked into.

16.4.1.6 Power take off Shaft:

The dimension "B1" of Power Take-Off Shaft does not meet the requirements of IS:4931-1995. This should be looked into for necessary corrective action.



16.4.1.7 Three point linkage:

The lateral distance from lower hitch point to centre line of tractor does not meet the requirement of IS: 4468 (Part-1) -1997. This should be looked into for necessary corrective action.

16.4.1.6 Operator's Seat:

The length of seat and the longitudinal distance from seat index point to the centre of differential lock pedal does not meet the requirement of IS: 12343-1998. This should be looked into for necessary corrective action.

16.4.2 Field performance test:

16.4.2.1 Wet land cultivation (Puddling operation):

No ingress of water/or mud in various assemblies/components was noticed during wetland cultivation of tractor. Hence, it meets the requirements of IS: 11082-1984 (technical requirements of agricultural tractors for wetland operation). The tractor is found suitable for wetland operation (Puddling).

16.5 Maintenance / Service Problems:

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

16.6 Recommendation with regard to safety on tractor:

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

- i) Provision for spark arresting device in exhaust system.
- ii) Provision of PTO shaft master shield.
- iii) Longitudinal distance from seat index point to centre of differential lock pedal should be within the limit of easy handling of tractor.
- iv) The length of seat is less than the minimum requirement.
- v) Fuel cut off knob is provided but does not remain in stop position
- vi) Water temperature blue zone colour code is not provided.
- vii) The working clearance between draft control lever and mudguard should be sufficient for operating the lever.

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 Manual
- ii) Part Catalogue
- iii) Service manual

16.7.2 The printed literature supplied with the test sample is in English. The literature may be brought out as per IS: 8132-1999 (Reaffirmed in March, 2009) for the guidance of user and service personnel in national as well as other regional languages.

16.8 Labeling plate:

The labeling plate riveted on LHS mudguard of tractor meets the requirements of IS: 10273 - 1987 (Reaffirmed in March, 2009). However the tractor make declared by the applicant in its specifications is different from the tractor make embossed on the specification plate.


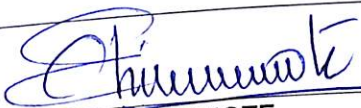
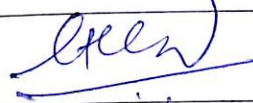
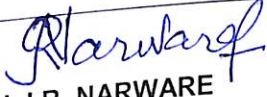
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17. CITIZEN CHARTER

Time frame for Testing & Evaluation as per Citizen Charter	Duration of test	Whether the report is released within the time frame given in the Citizen Charter	Remark
10 Months	11 Months (July, 2016 to June, 2017)	No	Due to waiting in drawbar test.

TESTING AUTHORITY:

		
C. K. TIJARE AGRICULTURAL ENGINEER	C. V. CHIMOTE TEST ENGINEER	Y. K. RAO SENIOR AGRICULTURAL ENGINEER
 J.J.R. NARWARE DIRECTOR		

18. APPLICANT'S COMMENTS

Para No.	Our Reference	Applicant's comments
18.1	1.20.3, 1.20.4, 1.20.5 (i), (ii), 1.20.6.	Observations will be studied & necessary action will be incorporated.
18.2	16.3 (ii), (iii), (ix).	Necessary quality check implemented in quality system.